FLUORESCENT LIGHTING

FOR

INDUSTRIAL

AND

COMMERCIAL

APPLICATIONS

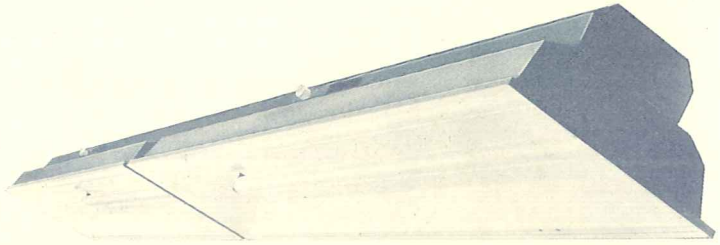
WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Lighting Division • Cleveland, Ohio

INDUSTRIAL

FLUORESCENT LIGHTING EQUIPMENT

TYPE FPS FLUORESCENT LAMP LUMINAIRES

With Porcelain Enamelled Reflector



Westinghouse "High Vision" Type FPS Luminaires mounted end-to-end on continuous wiring channels provide extended light lines with two or three 40-watt, Mazda F lamps per reflector.

CONSTRUCTION

One basic unit, separable in the middle, provides the two end sections for all runs. The basic unit and extensions are of four types: basic two-reflector complete unit which may also be used as an individual lighting unit; single-reflector extension; two-reflector extensions and blank channel sections with cover plate and channel connector to permit a continuing wireway, either at the extreme ends of a strip, or between reflector sections, and provide for future addition of ballasts, sockets and reflectors.

Channel is sheet-steel with all auxiliary equipment mounted in and wired. Basic two-reflector channel unit consists of two channels joined end-to-end. Opposite ends are closed by welded steel plates. Extensions have channel connectors assembled at one end with provision for joining to the opposite end of a second channel extension. Two tension-locked, quarter-turn thumb latches attach reflector to channel without use of tools.

Reflector is white porcelain-enameled iron with minimum overall efficiency of 79% for two-lamp reflectors and 72% for three-lamp reflectors. Shielding angle is 13°.

Lamp Holders are sturdy bakelite, twist-turn contacting type.

Lamp Starters are Type FS-4 mounted on the side of the channel.

Ballast Equipment—All units have twin-lamp ballasts with built-in compensators providing 95-99% power-factor except three-lamp basic two reflector units and one reflector extension units which use twin-lamp ballast with built-in compensator and single-lamp ballast—Minimum power factor is 92%.

Mounting—Units are arranged for conduit, messenger cable, twin-rod suspension or ceiling mounting.

Wiring—Units are furnished completely wired. Unwired units on special order.

Finish—The outside surface is covered with fused gray porcelain-enamel, and the reflecting surface with white porcelain-enamel. The channel is smooth silver-gray baked enamel.

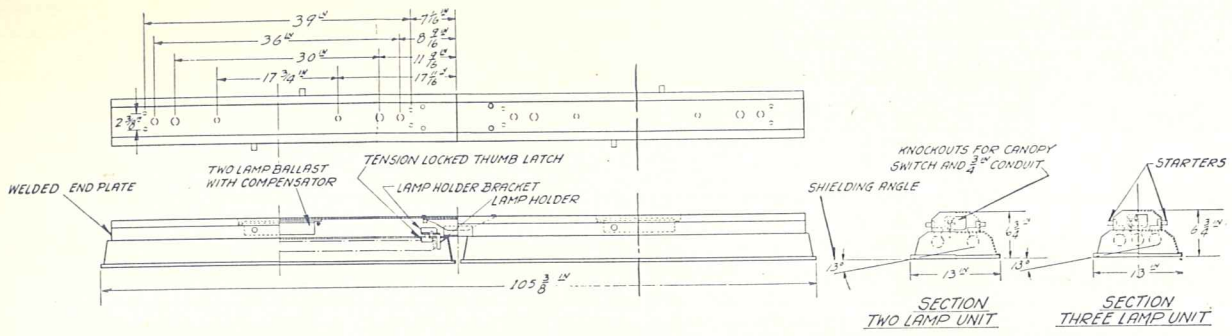
Approval—Units are approved by Underwriters' Laboratories, Inc. and the RLM Standards Institute.

COMPLETE UNITS—WIRED*—60-CYCLE†

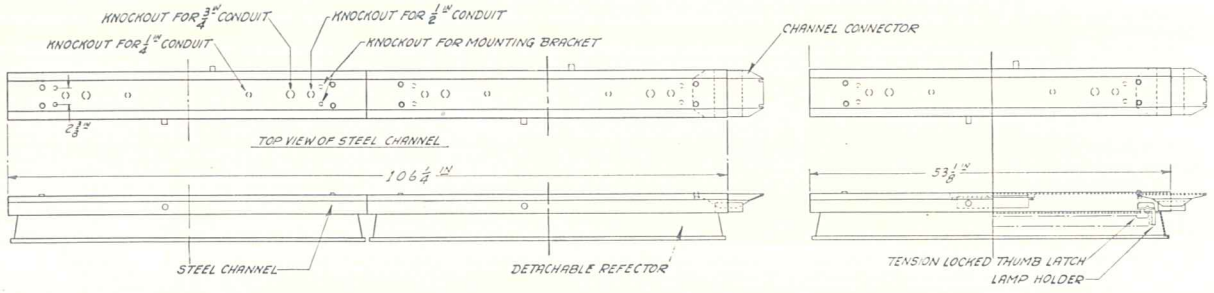
Luminaire Type	Description	Lamps		Circuit Volts	Style No.¶	Price¶	Maximum Overall Dimensions in Inches Including Reflector			Approx. Ship. Weight‡
		Watts	No.				Length	Width	Depth	
FOR TWO-LAMP REFLECTORS										
4FPS-40	Basic Two-Reflector Complete Unit	40	4	110–125	1 217 093	$46 75	105⅜	13	6¾	78
4FPS-40	Basic Two-Reflector Complete Unit	40	4	220–250	1 217 094	46 75	105⅜	13	6¾	78
4FPS-40 Extension	Two-Reflector Unit	40	4	110–125	1 217 095	45 70	106¼	13	6¾	78
4FPS-40 Extension	Two-Reflector Unit	40	4	220–250	1 217 096	45 70	106¼	13	6¾	78
2FPS-40 Extension	One-Reflector Unit	40	2	110–125	1 217 097	22 60	53⅛	13	6¾	40
2FPS-40 Extension	One-Reflector Unit	40	2	220–250	1 217 098	22 60	53⅛	13	6¾	40
FOR THREE-LAMP REFLECTORS										
6FPS-40	Basic Two-Reflector Complete Unit	40	6	110–125	1 217 099	56 35	105⅜	13	6¾	86
6FPS-40	Basic Two-Reflector Complete Unit	40	6	220–250	1 217 100	56 35	105⅜	13	6¾	86
6FPS-40 Extension	Two-Reflector Unit	40	6	110–125	1 217 101	55 30	106¼	13	6¾	86
6FPS-40 Extension	Two-Reflector Unit	40	6	220–250	1 217 102	55 30	106¼	13	6¾	86
3FPS-40 Extension	One-Reflector Unit	40	3	110–125	1 217 103	28 85	53⅛	13	6¾	44
3FPS-40 Extension	One-Reflector Unit	40	3	220–250	1 217 104	28 10	53⅛	13	6¾	44
ACCESSORIES										
Blank Channel Extension with Cover Plate		40	2 or 3	110–125	1 122 384	6 75	53⅛	..	...	..
Blank Channel Extension with Cover Plate		40	2 or 3	220–250	1 122 385	6 75	53⅛	..	...	..
Ceiling Mounting Bracket		..	..	... ...	1 122 307	35	...	..	...	..
Messenger Cable Clamp		..	..	... ...	1 217 117	55	...	..	...	..
Twin-Rod Suspension Brackets (Sets of 2)§		..	..	... ...	1 217 136	65	...	..	...	..

* Unwired Units furnished on special order at a decrease in price of $.50 for 2FPS-40; $.75 for 3FPS-40; $1.00 for 4FPS-40; and $1.50 for 6FPS-40 units.
† 50-cycle units available on special order for 115 or 230-volt circuits; prices on request.
¶ Lamps not included. § Rods not included.
‡ NOTE: Std. Pkg. 1. The right to ship in bulk is reserved when quantity justifies.

ENGINEERING DATA



Basic Two-Reflector Complete Unit—Type 4FPS-40 for Two Lamps Per Reflector, or Type 6FPS-40 for Three Lamps Per Reflector. A Basic Unit is Required for Each Continuous Strip More Than Two Reflectors Long. The Basic Unit is Separated in the Middle and Used as the End Units of the Complete Strip.



Two-Reflector Extension Unit—Type 4FPS-40 Extension for Two Lamps Per Reflector, or Type 6FPS-40 Extension for Three Lamps Per Reflector.

One-Reflector Extension Unit—Type 2FPS-40 for Two Lamps, or 3FPS-40 for Three Lamps.

ORDERING TABLE FOR TYPE FPS-40 LUMINAIRES

Overall Length Per Strip	No. of Reflectors Per Strip	Units Required Per Strip: Type 4FPS-40 S#1217093* or Type 6FPS-40 S#1217099*	Units Required Per Strip: 4FPS-40 Ext. S#1217095* or 6FPS-40 Ext. S#1217101*	Units Required Per Strip: 2FPS-40 Ext. S#1217097* or 3FPS-40 Ext. S#1217103*	No. Lamps Per Strip: Two Lamps Per Reflector	No. Lamps Per Strip: Three Lamps Per Reflector	Number Of Suspension Fittings Required: Conduit Mounting Stems (Not Furnished)	Number Of Suspension Fittings Required: Messenger Cable Clamps S#1217117	Number Of Suspension Fittings Required: Twin-Rod* Suspension Bracket Sets S#1217136	Number Of Suspension Fittings Required: Ceiling Mounting Brackets S#1122307
8′ 9 3/8″	2	1	..	..	4	6	2	2	2	2
13′ 2 1/2″	3	1	..	1	6	9	3	3	3	3
17′ 7 5/8″	4	1	1	..	8	12	3	3	3	3
22′ 3/4″	5	1	1	1	10	15	4	4	4	4
26′ 5 7/8″	6	1	2	..	12	18	4	4	4	4
30′ 11″	7	1	2	1	14	21	5	5	5	5
35′ 4 1/8″	8	1	3	..	16	24	5	5	5	5
39′ 9 1/4″	9	1	3	1	18	27	6	6	6	6
44′ 2 3/8″	10	1	4	..	20	30	6	6	6	6
48′ 7 1/2″	11	1	4	1	22	33	7	7	7	7
53′ 5/8″	12	1	5	..	24	36	7	7	7	7
57′ 5 3/4″	13	1	5	1	26	39	8	8	8	8
61′ 10 7/8″	14	1	6	..	28	42	8	8	8	8
66′ 4″	15	1	6	1	30	45	9	9	9	9
70′ 9 1/8″	16	1	7	..	32	48	9	9	9	9
75′ 2 1/4″	17	1	7	1	34	51	10	10	10	10
79′ 7 3/8″	18	1	8	..	36	54	10	10	10	10
84′ 1/2″	19	1	8	1	38	57	11	11	11	11
88′ 5 5/8″	20	1	9	..	40	60	11	11	11	11

* For 110-125 volts, 60 cycles—For 220-250 volts see listing table, opposite page.
** Brackets only—rods not furnished.

NOTE: **Determing Equipment Required**—In ordering for strips longer than given in the above table, divide the length of run required by 4.43. Drop all fractions in the answer. This figure is the "number of reflectors" needed for the strip.

Regardless of whether the number of reflectors is "odd" or "even," one basic two-reflector unit is required.

To determine the quantity of two-reflector extensions needed when the "number of reflectors" is even, subtract 2 from the "number of reflectors" (allowing for the two reflectors on the basic unit) and divide by 2.

When the "number of reflectors" is odd, one single-reflector extension is always needed. In addition, to determine the quantity of two-reflector extensions needed, subtract 3 from the "number of reflectors" (allowing for the two reflectors on the basic unit, plus the one on a single-reflector extension) and divide by 2.

For example, in determining the equipment required for a 130-foot run, divide 130 by 4.43. This is 29 and a fraction. Dropping the fraction we have 29 as the "number of reflectors required." To find the number of two-reflector extensions required (since 29 is an odd number), subtract 3 from the "number of reflectors," or 3 from 29, which is 26, and divide by 2, which gives 13. For a 130-foot run then, one would need 1 two-reflector basic unit, 1 single-reflector extension and 13 two-reflector extensions.

The required number of conduit stems or messenger cable clamps, or ceiling mounting brackets, or twin-rod suspension brackets, is always one for each extension piece, plus two for the basic unit.

INSTALLATION DESIGN DATA
WESTINGHOUSE TYPE FPS-40 FLUORESCENT LUMINAIRES

Mounting Height Above Floor (Feet)	(1) Maximum Spacing Between Strips (Feet)	(2) Area Per Reflector	(3) Room Proportions	Average Footcandles on Working Plane, White Lamps (3′ Above Floor) (4)	
				Two Lamp Reflector	Three Lamp Reflector
			Favorable	64	93
8	7½	34	Average	54	74
			Unfavorable	43	63
			Favorable	62	90
8½	8	35	Average	53	72
			Unfavorable	42	61
			Favorable	55	79
9	9	40	Average	46	63
			Unfavorable	37	53
			Favorable	46	67
10	10½	47	Average	39	54
			Unfavorable	31	46
			Favorable	41	59
11	12	53	Average	35	47
			Unfavorable	28	40
			Favorable	36	53
12	13½	60	Average	31	42
			Unfavorable	25	36
			Favorable	31	44
14	16	71	Average	26	35
			Unfavorable	21	30
			Favorable	26	38
16	19	84	Average	22	30
			Unfavorable	18	26
			Favorable	20	29
20	25	110	Average	17	23
			Unfavorable	13	19

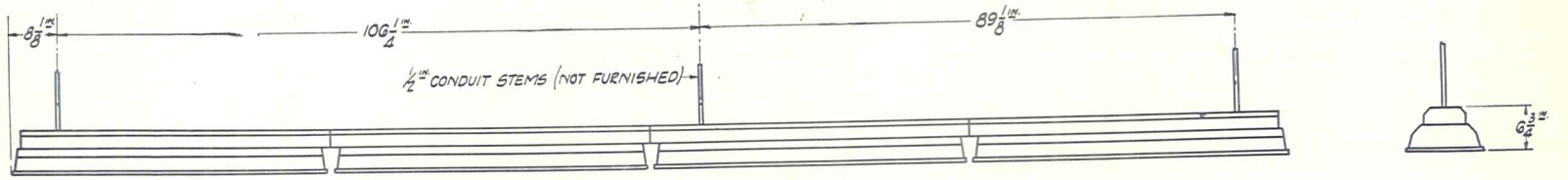
(1) Distance from wall to first strip should be one-half of spacing for general lighting. If there are benches along wall, this distance should only be about one-third of spacing.

(2) The Area Per Reflector given is calculated on the assumption that luminaires will extend the full length of the room, that is from wall to wall. If strips are shorter than length of room, the average area per lamp will be increased and footcandles will be proportionately reduced. The average area per reflector is calculated by dividing total room area by the number of reflectors.

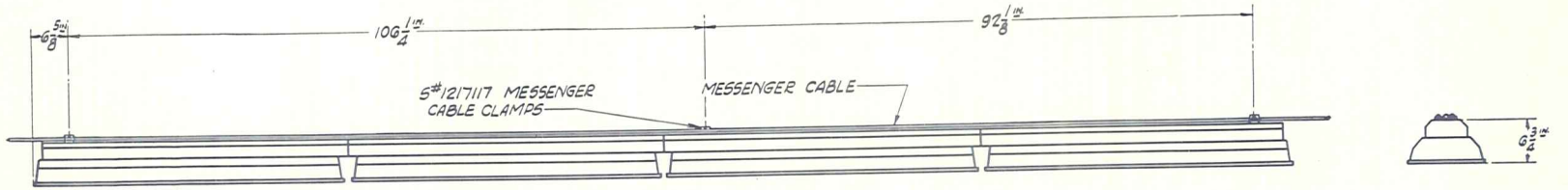
(3) ROOM PROPORTIONS—Use **Favorable** when room width equals four or more times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

(4) **Footcandle Values** are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation. **When used with daylight** Mazda Fluorescent lamps, multiply footcandle values by .81.

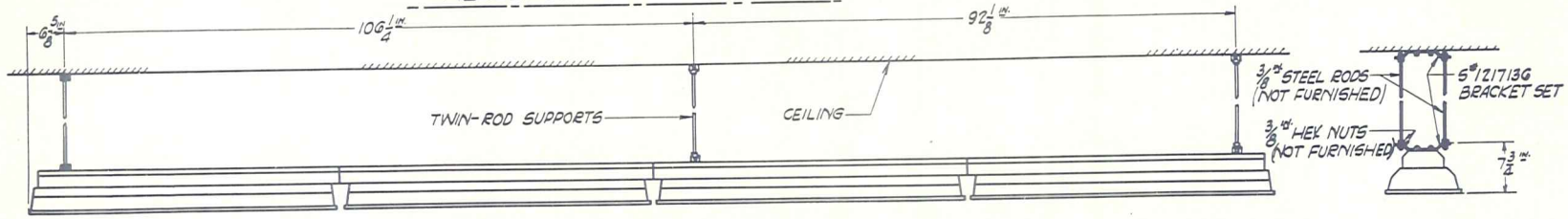
METHODS OF MOUNTING
WESTINGHOUSE TYPE FPS-40 FLUORESCENT LUMINAIRES



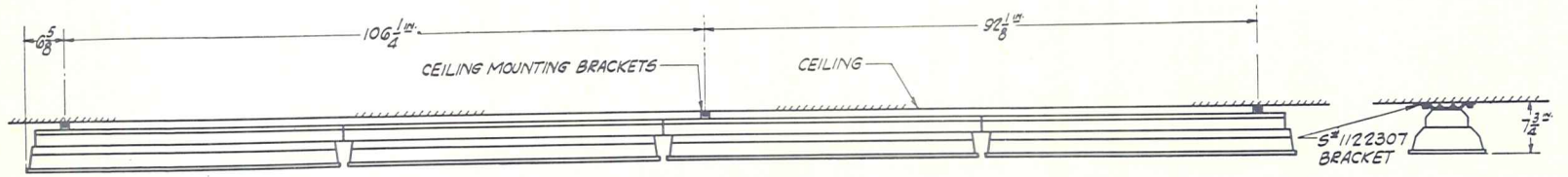
CONDUIT MOUNTING



MESSENGER CABLE MOUNTING



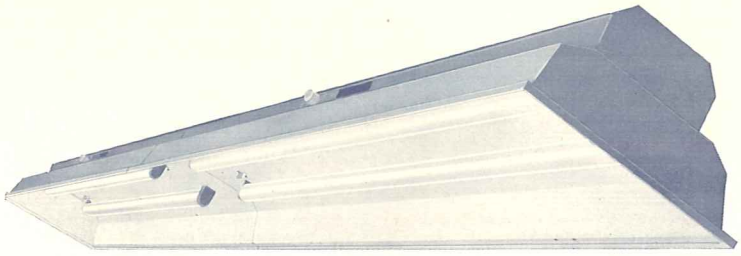
TWIN-ROD MOUNTING



CEILING MOUNTING

TYPE FPC FLUORESCENT LAMP LUMINAIRES

WITH PORCELAIN ENAMELED REFLECTOR



Westinghouse "High Vision" Type FPC Luminaires mounted end-to-end on continuous wiring channels provide extended light lines with two or three 40-watt, Mazda F lamps per reflector.

Reflectors are open-end type with the exception of end units, which have one end closed.

Construction

One basic unit, separable in the middle, provides the two end sections for all runs. The basic unit and extensions are of four types: basic two-reflector complete unit which may also be used as an individual lighting unit; single-reflector extension; two-reflector extensions and blank channel sections with cover plate and channel connector to permit a continuous wireway, and provide for future addition of ballasts, sockets and reflectors.

Channel is sheet-steel with all auxiliary equipment mounted and wired. Basic two-reflector channel unit consists of two channels joined end-to-end. Opposite ends are closed by welded steel plates. Extensions have channel connectors assembled at one end with provision for joining to the opposite end of a second channel extension. Two tension-locked, quarter-turn thumb latches attach reflector to channel without use of tools.

Reflector is white porcelain-enameled iron with minimum over-all efficiency of 79% for two-lamp reflectors and 72% for three-lamp reflectors. Shielding angle is 13°.

Lamp holders are sturdy Bakelite, twist-turn contacting type.

Lamp starters are Type FS-4 mounted on the side of the channel.

Ballast Equipment—All units have twin-lamp ballasts with built-in compensators providing 95-99% power-factor except three-lamp basic two reflector units and one reflector extension units which use twin-lamp ballast with built-in compensator and single-lamp ballast—Minimum power factor is 92%.

Mounting—Units are arranged for conduit, messenger cable, twin-rod suspension or ceiling mounting.

Wiring—Units are furnished completely wired. Unwired units on special order.

Finish—The outside surface is covered with fused gray porcelain-enamel, and the reflecting surface with white porcelain-enamel. The channel is smooth silver-gray baked enamel.

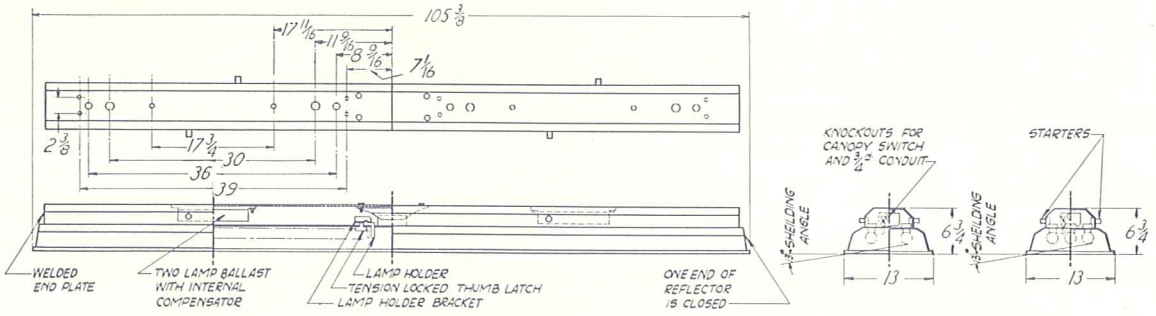
Approval—Units are approved by Underwriters' Laboratories, Inc. and the RLM Standards Institute.

COMPLETE UNITS—WIRED*—60-CYCLE†

Luminaire Type	Description	Lamps		Circuit Volts	Style No.¶	Price¶	Maximum Over-all Dimensions in Inches Including Reflector			Approx. Ship. Wt. Lb.‡
		Watts	No.				Length	Width	Depth	
For Two-Lamp Reflectors										
4FPC-40	Basic Two-Reflector Complete Unit	40	4	110–125	1 217 105	$44 35	106¼	13	6¾	76
4FPC-40	Basic Two-Reflector Complete Unit	40	4	220–250	1 217 106	44 35	106¼	13	6¾	76
4FPC-40 Extension	Two-Reflector Unit	40	4	110–125	1 217 107	40 90	106¼	13	6¾	76
4FPC-40 Extension	Two Reflector Unit	40	4	220–250	1 217 108	40 90	106¼	13	6¾	76
2FPC-40 Extension	One-Reflector Unit	40	2	110–125	1 217 109	20 20	53⅛	13	6¾	39
2FPC-40 Extension	One-Reflector Unit	40	2	220–250	1 217 110	20 20	53⅛	13	6¾	39
For Three-Lamp Reflectors										
6FPC-40	Basic Two-Reflector Complete Unit	40	6	110–125	1 217 111	53 95	106¼	13	6¾	84
6FPC-40	Basic Two-Reflector Complete Unit	40	6	220–250	1 217 112	53 95	106¼	13	6¾	84
6FPC-40 Extension	Two-Reflector Unit	40	6	110–125	1 217 113	50 50	106¼	13	6¾	84
6FPC-40 Extension	Two-Reflector Unit	40	6	220–250	1 217 114	50 50	106¼	13	6¾	84
3FPC-40 Extension	One-Reflector Unit	40	3	110–125	1 217 115	26 45	53⅛	13	6¾	42
3FPC-40 Extension	One-Reflector Unit	40	3	220–250	1 217 116	25 70	53⅛	13	6¾	42
Accessories										
Blank Channel Extension with Cover Plate		40	2 or 3	110–125	1 122 384	6 75	53⅛	..	...	..
Blank Channel Extension with Cover Plate		40	2 or 3	220–250	1 122 385	6 75	53⅛	..	...	..
Ceiling Mounting Bracket		..	.	... ...	1 122 307	35	....	..	...	..
Messenger Cable Clamp		..	.	... ...	1 217 117	55	....	..	...	..
Twin-Rod Suspension Brackets (Sets of 2) §		..	.	... ...	1 217 136	65	....	..	...	..

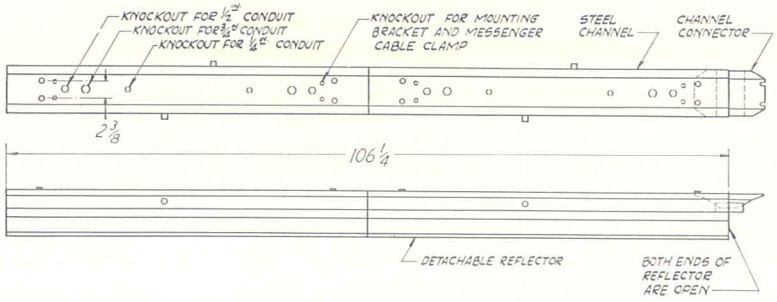
* Unwired Units furnished on special order at a decrease in price of $.50 for 2FPC-40; $1.00 for 4FPC-40; $.75 for 3FPC-40; and $1.50 for 6FPC-40 units.
† 50-cycle units available on special order for 115 or 230-volt circuits; prices on request.
¶ Lamps not included. § Rods not included.
‡ NOTE: Std. Pkg. 1. The right to ship in bulk is reserved when quantity justifies.

ENGINEERING DATA



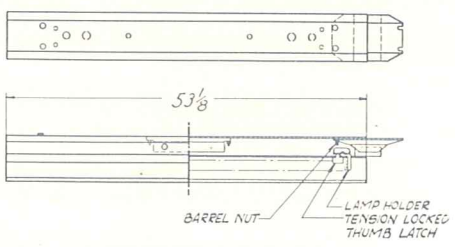
BASIC COMPLETE UNIT TYPE 4FPC-40 AND 6FPC-40 — TWO LAMP UNIT — THREE LAMP UNIT

BASIC TWO-REFLECTOR COMPLETE UNIT—TYPE 4FPC-40 FOR TWO LAMPS PER REFLECTOR, OR TYPE 6FPC-40 FOR THREE LAMPS PER REFLECTOR. A BASIC UNIT IS REQUIRED FOR EACH CONTINUOUS STRIP MORE THAN TWO REFLECTORS LONG. THE BASIC UNIT IS SEPARATED IN THE MIDDLE AND USED AS THE END UNITS OF THE COMPLETE STRIP.



TWO REFLECTOR EXTENSION
TYPE 4FPC-40 OR 6FPC EXTENSIONS

TWO-REFLECTOR EXTENSION UNIT—TYPE 4FPC-40 EXTENSION FOR TWO LAMPS PER REFLECTOR, OR TYPE 6FPC-40 EXTENSION FOR THREE LAMPS PER REFLECTOR.



ONE REFLECTOR EXTENSION
TYPE 2FPC-40 AND 3FPC-40 EXTENSIONS

ONE-REFLECTOR EXTENSION UNIT—TYPE 2FPC-40 FOR TWO LAMPS, OR 3FPC-40 FOR THREE LAMPS.

ORDERING TABLE FOR TYPE FPC-40 LUMINAIRES

Over-all Length Per Strip	No. of Reflectors Per Strip	Units Required Per Strip: Type 4FPC-40 Style 1217105* or Type 6FPC-40 Style 1217111*	Units Required Per Strip: 4FPC-40 Ext. Style 1217107* or 6FPC-40 Ext. Style 1217113*	Units Required Per Strip: 2FPC-40 Ext. Style 1217109* or 3FPC-40 Ext. Style 1217115*	No. Lamps Per Strip: Two Lamps Per Reflector	No. Lamps Per Strip: Three Lamps Per Reflector	Number of Suspension Fittings Required: Conduit Mounting Stems (Not Furnished)	Number of Suspension Fittings Required: Messenger Cable Clamps Style 1217117	Number of Suspension Fittings Required: Twin-Rod† Suspension Bracket Sets Style 1217136	Number of Suspension Fittings Required: Ceiling Mounting Brackets Style 1122307
8′ 9 3/8″	2	1	..	..	4	6	2	2	2	2
13′ 2 1/2″	3	1	..	1	6	9	3	3	3	3
17′ 7 5/8″	4	1	1	..	8	12	3	3	3	3
22′ 3/4″	5	1	1	1	10	15	4	4	4	4
26′ 5 7/8″	6	1	2	..	12	18	4	4	4	4
30′ 11″	7	1	2	1	14	21	5	5	5	5
35′ 4 1/8″	8	1	3	..	16	24	5	5	5	5
39′ 9 1/4″	9	1	3	1	18	27	6	6	6	6
44′ 2 3/8″	10	1	4	..	20	30	6	6	6	6
48′ 7 1/2″	11	1	4	1	22	33	7	7	7	7
53′ 5/8″	12	1	5	..	24	36	7	7	7	7
57′ 5 3/4″	13	1	5	1	26	39	8	8	8	8
61′ 10 7/8″	14	1	6	..	28	42	8	8	8	8
66′ 4″	15	1	6	1	30	45	9	9	9	9
70′ 9 1/8″	16	1	7	..	32	48	9	9	9	9
75′ 2 1/4″	17	1	7	1	34	51	10	10	10	10
79′ 7 3/8″	18	1	8	..	36	54	10	10	10	10
84′ 1/2″	19	1	8	1	38	57	11	11	11	11
88′ 5 5/8″	20	1	9	..	40	60	11	11	11	11

* For 110-125 volts, 60 cycles—For 220-250 volts see listing table, opposite page.
† Brackets only—rods not furnished.

NOTE: **Determining Equipment Required**—In ordering for strips longer than given in the above table, divide the length of run required by 4.43. Drop all fractions in the answer. This figure is the "number of reflectors" needed for the strip.

Regardless of whether the number of reflectors is "odd" or "even," one basic two-reflector unit is required.

To determine the quantity of two-reflector extensions needed when the "number of reflectors" is even, subtract 2 from the "number of reflectors" (allowing for the two reflectors on the basic unit) and divide by 2.

When the "number of reflectors" is odd, one single-reflector extension is always needed. In addition, to determine the quantity of two-reflector extensions needed, subtract 3 from the "number of reflectors" (allowing for the two reflectors on the basic unit, plus the one on a single-reflector extension) and divide by 2.

For example, in determining the equipment required for a 130-foot run, divide 130 by 4.43. This is 29 and a fraction. Dropping the fraction we have 29 as the "number of reflectors required." To find the number of two-reflector extensions required (since 29 is an odd number), subtract 3 from the "number of reflectors," or 3 from 29, which is 26, and divide by 2, which gives 13. For a 130-foot run then, one would need 1 two-reflector basic unit, 1 single-reflector extension and 13 two-reflector extensions.

The required number of conduit stems or messenger cable clamps, or ceiling mounting brackets, or twin-rod suspension brackets, is always one for each extension piece, plus two for the basic unit.

INSTALLATION DESIGN DATA
WESTINGHOUSE TYPE FPC-40 FLUORESCENT LUMINAIRES

Mounting Height Above Floor (Feet)	(1) Maximum Spacing Between Strips (Feet)	(2) Area Per Reflector	(3) Room Proportions	Average Footcandles on Working Plane, White Lamps (3′ Above Floor) (4)	
				Two Lamp Reflector	Three Lamp Reflector
8	7½	34	Favorable	64	93
			Average	54	74
			Unfavorable	43	63
8½	8	35	Favorable	62	90
			Average	53	72
			Unfavorable	42	61
9	9	40	Favorable	55	79
			Average	46	63
			Unfavorable	37	53
10	10½	47	Favorable	46	67
			Average	39	54
			Unfavorable	31	46
11	12	53	Favorable	41	59
			Average	35	47
			Unfavorable	28	40
12	13½	60	Favorable	36	53
			Average	31	42
			Unfavorable	25	36
14	16	71	Favorable	31	44
			Average	26	35
			Unfavorable	21	30
16	19	84	Favorable	26	38
			Average	22	30
			Unfavorable	18	26
20	25	110	Favorable	20	29
			Average	17	23
			Unfavorable	13	19

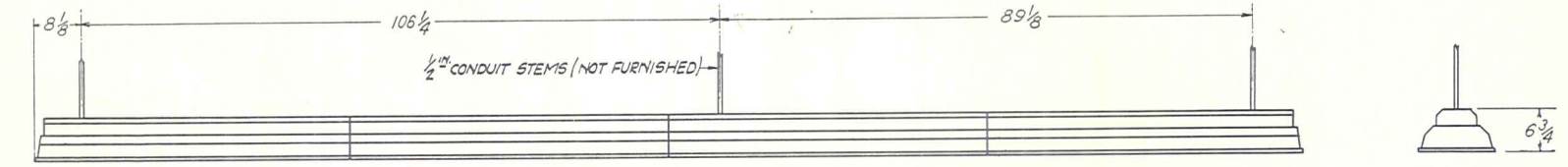
(1) Distance from wall to first strip should be one-half of spacing for general lighting. If there are benches along wall, this distance should only be about one-third of spacing.

(2) The Area Per Reflector given is calculated on the assumption that luminaires will extend the full length of the room, that is from wall to wall. If strips are shorter than length of room, the average area per lamp will be increased and footcandles will be proportionately reduced. The average area per reflector is calculated by dividing total room area by the number of reflectors.

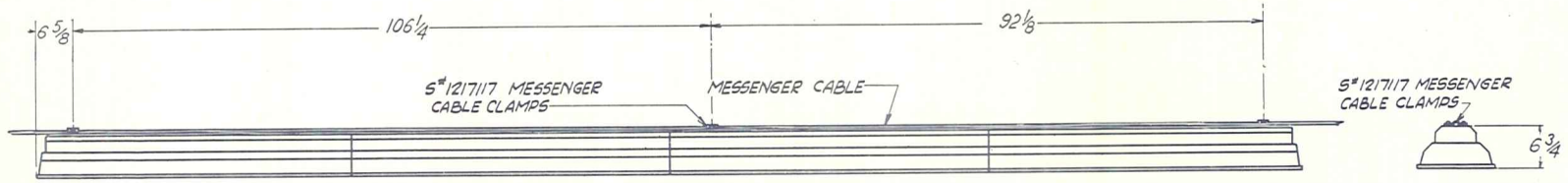
(3) **ROOM PROPORTIONS**—Use **Favorable** when room width equals four or more times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

(4) **Footcandle Values** are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation. **When used with daylight** Mazda Fluorescent lamps, multiply footcandle values by .81.

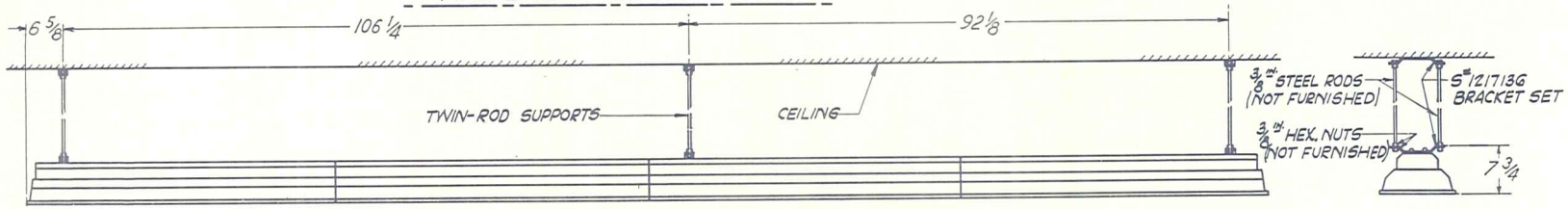
METHODS OF MOUNTING
WESTINGHOUSE TYPE FPC-40 FLUORESCENT LUMINAIRES



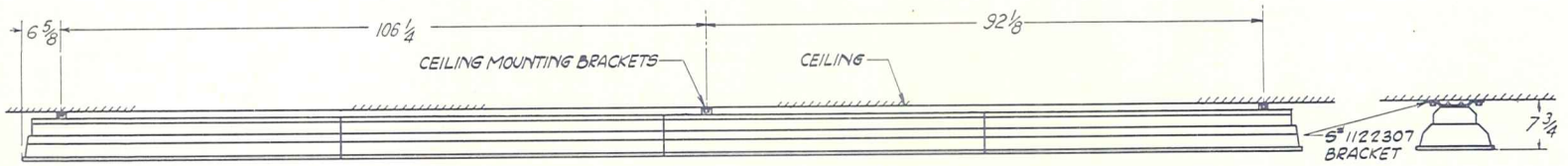
CONDUIT MOUNTING



MESSENGER CABLE MOUNTING



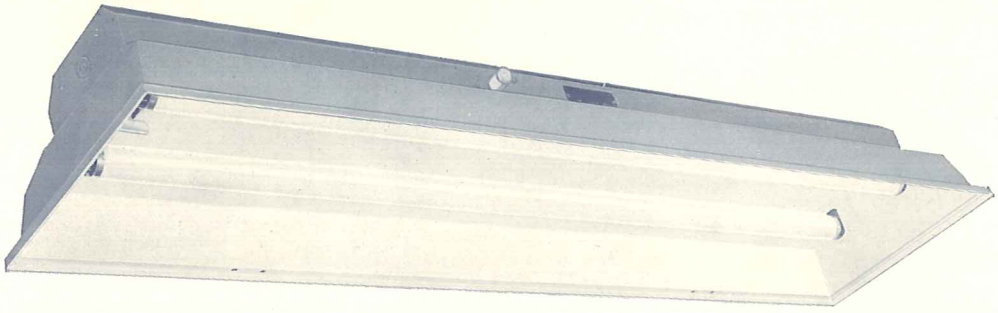
TWIN-ROD MOUNTING



CEILING MOUNTING

TYPE 2FP-40 AND 3FP-40 RLM FLUORESCENT LAMP LUMINAIRES

With Porcelain Enameled Reflector



TWIN LAMP RLM FLUORESCENT LUMINAIRE-PORCELAIN ENAMELED REFLECTOR

Westinghouse RLM Standard Fluorescent Luminaires are designed for general or supplementary lighting in industrial areas using 40-watt, 48-inch Mazda "F" Fluorescent lamps. They are built to rigid RLM Standards specifications and are available in two or three-lamp type.

Construction

Units consist of a hood, reflector, lamp holders, lamp starters and ballast equipment.

Hood is fabricated from sheet-steel with all ballasts, lamp holders and lamp starters mounted and wired as a part of the hood assembly. Two tension-locked, quarter-turn thumb latches permit attachment of reflector to hood without use of tools.

Reflector is of highest grade white porcelain-enameled steel providing an overall efficiency of 79% with two-lamp units and 72% with three-lamp units. The shielding angle is 13° (see diagram on opposite page).

Lamp Holders are sturdy Bakelite, twist-turn contacting type.

Lamp Starters consist of a metal container which fits a bayonet connection in the starter socket conveniently located on the side of hood. The unit consists of a glow switch and a condenser to minimize radio interference. It may be replaced as readily as the lamp itself.

Ballast Equipment used is a standard current limiting device, as described in Westinghouse Catalog Section 61-272. One twin-lamp ballast with built-in compensator in the two-lamp units and one twin-lamp ballast with built-in compensator and one high power factor single-lamp ballast in the three-lamp units provide high power factor of 95%–99% for two-lamp units and over 92% power factor for three-lamp units, minimize cyclic flicker and assure satisfactory lamp performance.

Mounting—Units are arranged for rigid conduit, flexible conduit, or chain mounting. Two suspension brackets on top provide for level or angular chain mounting; two ½″ knockouts on 36″ centers or two ¾″ knockouts on 30″ centers provide for conduit mounting, and two ⅜″ knockouts on 17¾″ centers for twin stem hangers.

Wiring—Units are furnished completely wired. Unwired units supplied on special order include ballasts starter blocks and sockets assembled with full length leads for connection to sockets.

Finish—The reflector is first completely covered by a ground coat of fused porcelain enamel. The outside surface is then covered with one coat of fused gray porcelain-enamel, and the entire reflecting surface with two coats of separately fired white porcelain-enamel. The hood is finished with a smooth silver-gray baked enamel paint.

Approval—Units are approved by Underwriters' Laboratories, Inc. and the RLM Standards Institute, and are so labeled.

Accessories

End knockout permits installation of a switch if desired. For 110-volt, single-pole Levolier switch, add $1.00 to price of unit; for 220-volt, double-pole switch, add $1.85. Units supplied with 6 feet of 3-conductor, rubber-covered cord and plug, add $1.20 to price of unit.

COMPLETE UNITS—WIRED*—60-CYCLE†

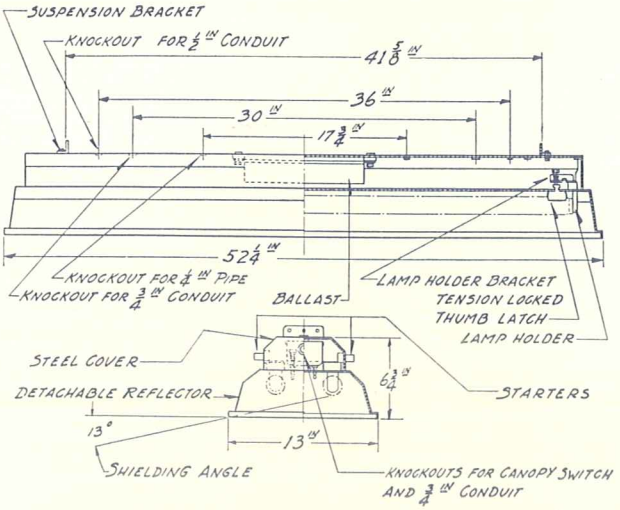
Luminaire Type	Lamps		Circuit Volts	Style No.**	Price**	Standard Package	
	Watts	Number				Quantity	Weight Lb.
FOR 2 MAZDA "F" LAMPS							
2-FP-40	40	2	110–125	1 217 039	$23 55	1	39
2-FP-40	40	2	199–216	1 217 040	23 55	1	39
2-FP-40	40	2	220–250	1 217 041	23 55	1	39
FOR 3 MAZDA "F" LAMPS							
3-FP-40	40	3	110–125	1 217 042	30 40	1	36
3-FP-40	40	3	199–216	1 217 043	30 40	1	36
3-FP-40	40	3	220–250	1 217 044	30 40	1	36

* Unwired units furnished on special order at a decrease in price of $ .50 for the 2FP-40 and $ .75 for the 3FP-40 units.
† 50-cycle units available on special order for 115 or 230 volt circuits at $2.05 additional for the 2FP-40 and $4.10 for the 3FP-40 units.
** Lamps not included.

Prices are subject to change without notice.

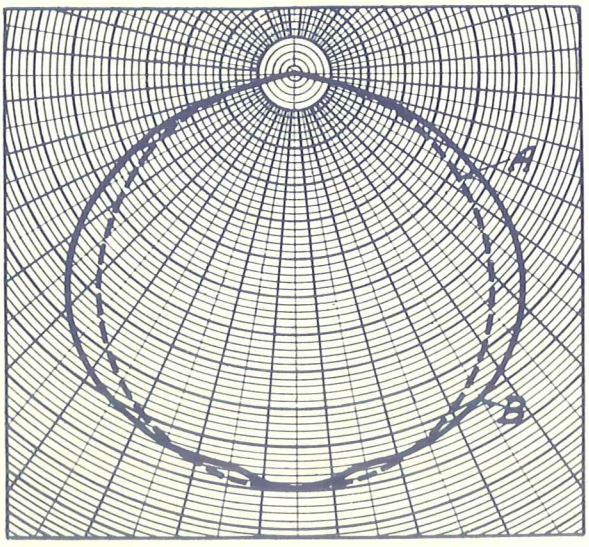
Order by Style Number

ENGINEERING DATA



CONSTRUCTION OUTLINE OF FLUORESCENT LAMP LUMINAIRES

Both two and three lamp units have same dimensions.



A. Parallel to Lamp

B. Normal to Lamp

TYPICAL DISTRIBUTION CURVES OF FLUORESCENT LUMINAIRE—SPREAD DISTRIBUTION

INSTALLATION DESIGN DATA FOR TYPE 2FP-40 AND 3FP-40 RLM FLUORESCENT LUMINAIRES

Mounting Height Above Floor (Feet)	Maximum Spacing (Feet)	Area Per Outlet (Sq. Ft.)	Room Proportions	Average Footcandles on Working Plane (3′ Above Floor) White Lamps*	
				2-FP-40	3-FP-40
8	7 x 7	49	Favorable Average Unfavorable	45 40 33	66 57 45
8½	8 x 8	64	Favorable Average Unfavorable	34 30 25	50 43 34
9	9 x 9	81	Favorable Average Unfavorable	27 24 20	40 34 27
10	10 x 10	100	Favorable Average Unfavorable	22 19 16	32 28 22
11	11 x 11	121	Favorable Average Unfavorable	18 16 13	27 23 18
12	12 x 12	144	Favorable Average Unfavorable	15 13 11	22 19 15

Use 10′ Mounting Height Where Possible

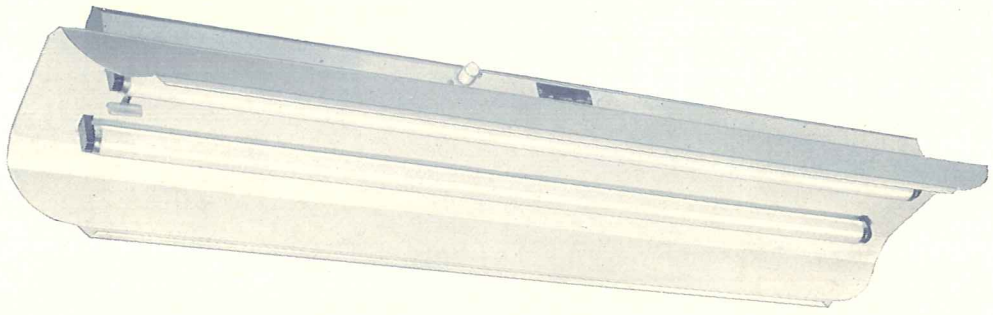
ROOM PROPORTIONS—Use **Favorable** when room width equals four times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

Footcandle values are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation.

* **When used with 40 watt daylight** Fluorescent Mazda lamps, multiply values by .81.

TYPE 2-FPR-40 AND 3-FPR-40 RLM FLUORESCENT LAMP LUMINAIRES

With Porcelain Enamelled Reflector



TWIN LAMP RLM OPEN END FLUORESCENT LUMINAIRE-PORCELAIN ENAMELLED REFLECTOR

Westinghouse RLM Open End Fluorescent Luminaires are designed for general or supplementary lighting in industrial areas using 40-watt, 48-inch Mazda "F" Fluorescent lamps.

Construction

Units consist of a hood, reflector, lamp holders, lamp starters and ballast equipment.

Hood is fabricated from sheet-steel with all ballasts, lamp holders and lamp starters mounted and wired as a part of the hood assembly. Two tension-locked, quarter-turn thumb latches permit attachment of reflector to hood without use of tools.

Reflector is of highest grade white porcelain-enamelled steel providing an overall efficiency of 79% with two-lamp units and 72% with three-lamp units. The shielding angle is 13° (see diagram on opposite page).

Lamp Holders are sturdy Bakelite, twist-turn contacting type.

Lamp Starters consist of a metal container which fits a bayonet connection in the starter socket conveniently located on the side of hood. The unit consists of a glow switch and a condenser to minimize radio interference. It may be replaced as readily as the lamp itself.

Ballast Equipment used is a standard current limiting device, as described in Westinghouse Catalog Section 61-272. One twin-lamp ballast with built-in compensator in the two-lamp units and one twin-lamp ballast with built-in compensator and one high power factor single-lamp ballast in the three-lamp units provide high power factor of 95%–99% for two-lamp units and over 92% power factor for three-lamp units.

Mounting—Units are arranged for rigid conduit, flexible conduit, or chain mounting. Two suspension brackets on top provide for level or angular chain mounting; two ½" knockouts on 36" centers or two ¾" knockouts on 30" centers provide for conduit mounting, and two ⅜" knockouts on 17¾" centers for twin stem hangers.

Wiring—Units are furnished completely wired. Unwired units supplied on special order include ballast starter blocks and sockets assembled with full length leads for connection to sockets.

Finish—The reflector is first completely covered by a ground coat of fused porcelain-enamel. The outside surface is then covered with one coat of fused gray porcelain-enamel, and the entire reflecting surface with two coats of separately fired white porcelain-enamel. The hood is finished with a smooth silver-gray baked enamel paint.

Approval—Units are approved by Underwriters' Laboratories, Inc. and RLM Standards Institute, and are so labeled.

Accessories

End knockout permits installation of a switch if desired. For 110-volt, single-pole Levolier switch, add $1.00 to price of unit; for 220-volt, double-pole switch, add $1.85. Units supplied with 6 feet of 3-conductor, rubber-covered cord and plug, add $1.20 to price of unit.

COMPLETE UNITS—WIRED*—60-CYCLE†

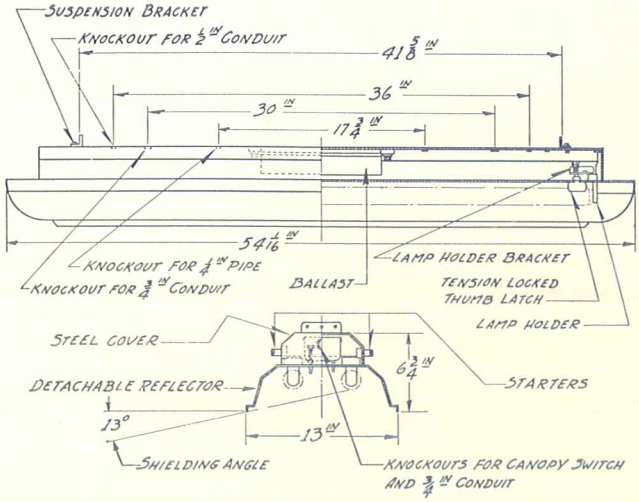
Luminaire Type	Lamps		Circuit Volts	Style No.§	Price§	Standard Package	
	Watts	Number				Quantity	Wt., Lb.
FOR 2 MAZDA "F" LAMPS							
2-FPR-40	40	2	110–125	1 217 168	$18.65	1	33
2-FPR-40	40	2	199–216	1 217 169	18.65	1	33
2-FPR-40	40	2	220–250	1 217 170	18.65	1	33
FOR 3 MAZDA "F" LAMPS							
3FPR-40	40	3	110–125	1 217 171	27.85	1	36
3FPR-40	40	3	199–216	1 217 172	26.55	1	36
3FPR-40	40	3	220–250	1 217 173	26.55	1	36

* Unwired units furnished on special order at a decrease in price of $.50 for 2FPR-40, and $.75 for 3FPR-40.
† 50-cycle units available on special order for 115 or 230-volt circuits at $2.05 additional for 2FPR-40, and $4.10 for 3FPR-40.
§ Lamps not included.

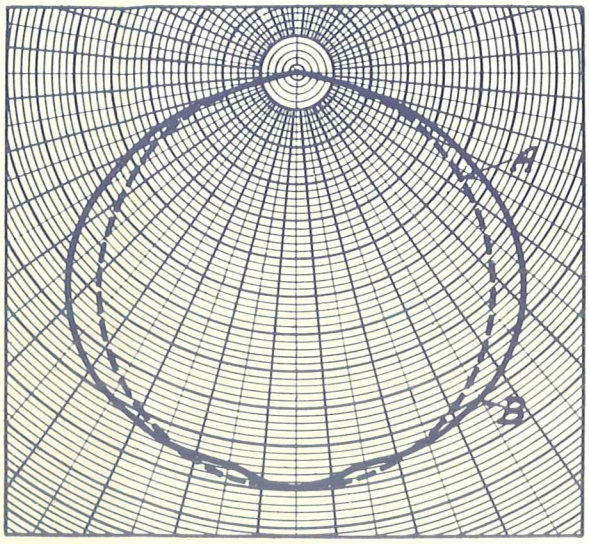
Prices are subject to change without notice.

Order by Style Number

ENGINEERING DATA



CONSTRUCTION OUTLINE OF FLUORESCENT LAMP LUMINAIRES



A. Parallel to Lamp
B. Normal to Lamp

TYPICAL DISTRIBUTION CURVES OF FLUORESCENT LUMINAIRE—SPREAD DISTRIBUTION

INSTALLATION DESIGN DATA FOR TYPE 2-FPR-40 AND 3-FPR-40 RLM FLUORESCENT LUMINAIRES

Mounting Height Above Floor (Feet)	Maximum Spacing (Feet)	Area Per Outlet (Sq. Ft.)	Room Proportions	Average Footcandles On Working Plane (3' Above Floor) White Lamps*	
				2FPR-40	3FPR-40
8	7 x 7	49	Favorable Average Unfavorable	45 40 33	66 57 45
8½	8 x 8	64	Favorable Average Unfavorable	34 30 25	50 43 34
9	9 x 9	81	Favorable Average Unfavorable	27 24 20	40 34 27
10	10 x 10	100	Favorable Average Unfavorable	22 19 16	32 28 22
11	11 x 11	121	Favorable Average Unfavorable	18 16 13	27 23 18
12	12 x 12	144	Favorable Average Unfavorable	15 13 11	22 19 15

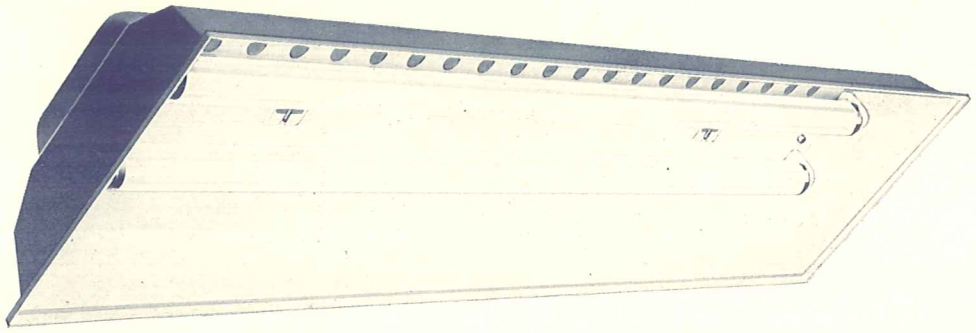
Use 10' Mounting Height where possible

ROOM PROPORTIONS—Use **Favorable** when room width equals four times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

Footcandle values are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation.

* **When used with 40 watt daylight** Fluorescent Mazda lamps, multiply values by .81.

TYPE 2-FP-100 RLM FLUORESCENT LAMP LUMINAIRES



Westinghouse Type 2-FP-100 RLM Fluorescent Luminaires are designed for general lighting where high levels of illumination or mounting heights up to 20 feet are required.

Construction

Hood is sheet steel with all auxiliary equipment mounted and wired as a part of the hood assembly.

Reflector Support consists of two tension locked thumb latches requiring only quarter turn to permit removal of reflector without disturbing line connections.

Reflectors are available with or without diffuser openings in the top of the reflector. The Diffuser unit allows a minimum 2½% upward light—reducing brightness contrast between ceiling and lighted areas. Both reflectors provide a shielding angle of 14° below the horizontal when viewed normal to the lamps, and provide an overall efficiency of not less than 73% in 0° to 90° zone and not less than 2½% in the 90° to 180° zone with openings.

Lamp Holders are sturdy bakelite, mogul size twist-turn contacting type.

Lamp Starters are standard Type FS-6, mounted between lamps for convenience.

Ballast Equipment—Standard two lamp, as described in Westinghouse Catalog Section 61-272, provide high power factor of 95% to 99%, minimize cyclic flicker, and assure satisfactory lamp performance.

Mounting—Units are arranged for rigid conduit, flexible conduit, or chain mounting. Two suspension brackets on hood with 46″ centers provide for vertical or angular chain mounting, two ½″ knockouts on 30″ and 36″ centers provide for conduit mounting. A ½″ knockout is also provided in each end of the hood.

Wiring—Units are furnished completely wired. Unwired units supplied on special order include ballast assembled, unassembled sockets, lamp starters and full length leads of proper size wire.

Finish—The reflector is first completely covered by a ground coat of fused porcelain enamel. The outside surface is then covered with one coat of fused gray porcelain-enamel, and the entire reflecting surface with two coats of separately fired white porcelain-enamel. The hood is finished with a smooth silver gray baked enamel paint.

Approval—Units are approved by the Underwriters' Laboratories, Inc. and are the RLM Standards Institute and are so labeled.

Accessories

For 110-volt, single-pole Levolier switch add $1.00 to price of unit. For 220-volt, double-pole switch add $1.85 Units supplied with 6 feet of 3-wire rubber covered cord and plug add $1.20.

COMPLETE UNITS—WIRED* 60-CYCLE†

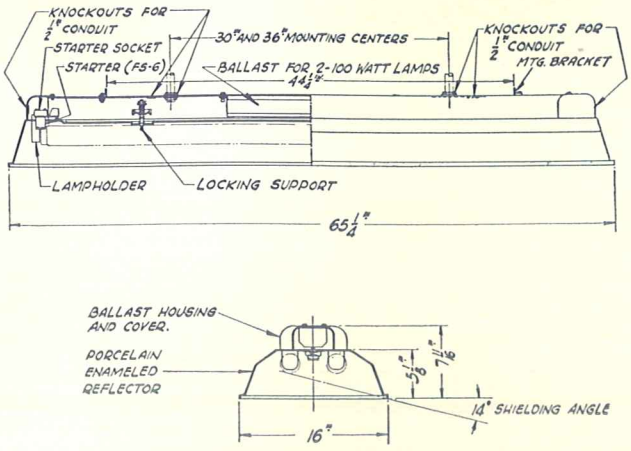
Luminaire Type	Lamps		Circuit Volts	Style No.**	Price**	Standard Package	
	Watts	Number				Quantity	Weight, Lb.
Totally Direct Type 2-FP-100	100	2	110–125	1 121 928	$38 50	1	73
Totally Direct Type 2-FP-100	100	2	199–216	1 121 929	38 50	1	73
Totally Direct Type 2-FP-100	100	2	220–250	1 121 930	38 50	1	73
Diffuser Type 2-FP-100	100	2	110–125	1 121 932	39 75	1	73
Diffuser Type 2-FP-100	100	2	199–216	1 121 933	39 75	1	73
Diffuser Type 2-FP-100	100	2	220–250	1 121 934	39 75	1	73
Accessories: Safe Change Hanger, Two Wire				346 571	2 75	10	15
Accessories: Swivel, ½″ conduit				1 119 757	1 20	10	12

* Unwired units furnished on special order at a decrease in price of $0.75
† 50-Cycle units available on special order for 115 or 230-volt circuits, prices furnished on request.
** Lamps not included.

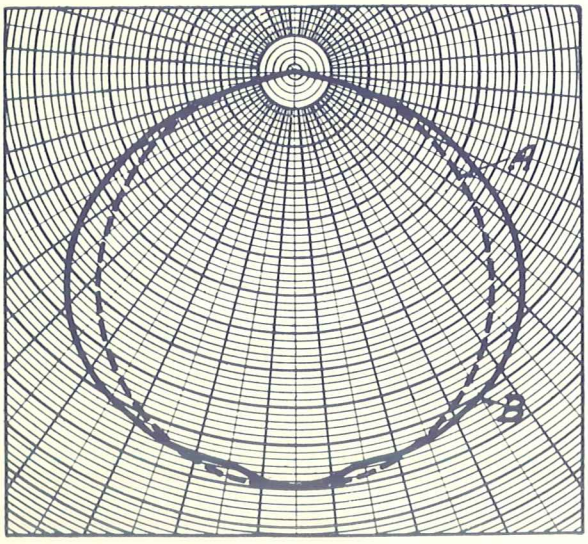
Prices are subject to change without notice.

Order by Style Number

ENGINEERING DATA



CONSTRUCTION OUTLINE OF FLUORESCENT LAMP LUMINAIRES



A. Parallel to Lamp
B. Normal to Lamp

TYPICAL DISTRIBUTION CURVES OF FLUORESCENT LUMINAIRE—SPREAD DISTRIBUTION

INSTALLATION DESIGN DATA FOR TYPE 2-FP-100 RLM FLUORESCENT LUMINAIRE

Mounting Height Above Floor (Feet)	Maximum Spacing (Feet)	Area Per Outlet (Sq. Ft.)	Room Proportion	Approx. Average* Footcandles On Working Plane 3′ Above Floor; White Lamps	
				Direct Type	Diffuser Type
9	9 x 9	81	Favorable Average Unfavorable	53 47 35	54 47 36
10	10 x 10	100	Favorable Average Unfavorable	43 36 28	44 38 29
11	11 x 11	121	Favorable Average Unfavorable	35 30 23	36 31 24
12	12 x 12	144	Favorable Average Unfavorable	29 25 19	30 26 20
13	13 x 13	169	Favorable Average Unfavorable	25 22 17	26 22 17
14	14 x 14	196	Favorable Average Unfavorable	22 19 14	23 19 15
15	15 x 15	225	Favorable Average Unfavorable	19 16 13	20 17 14
16	16 x 16	256	Favorable Average Unfavorable	17 14 11	17 15 12
17	17 x 17	289	Favorable Average Unfavorable	15 12 10	15 14 11
18	18 x 18	324	Favorable Average Unfavorable	14 11 9	14 12 9

Use at least 10′ mounting height wherever possible.

ROOM PROPORTIONS—Use **Favorable** when room width equals four times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

Footcandle values are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation.

* When used with 100 watt Daylight Fluorescent Mazda "F" Lamps, multiply values by .80.

TYPE 2-FPR-100 FLUORESCENT LAMP LUMINAIRES

Westinghouse Open End Fluorescent Luminaires are for general lighting where high levels of illumination or mounting heights up to 20 feet are required.

Construction

Hood is sheet steel with all auxiliary equipment mounted and wired as a part of the hood assembly.

Reflector Support consists of two tension locked thumb latches requiring only quarter turn to permit removal of reflector without disturbing line connections.

Reflectors are available with or without diffuser openings in the top. The Diffuser unit allows a minimum of 2½% upward light reducing brightness contrast between ceiling and lighted areas. Both reflectors provide a shielding angle of 14° below the horizontal when viewed normal to the lamps.

Lamp Holders are sturdy bakelite, mogul size twist-turn contacting type.

Lamp Starters are standard Type FS-6, mounted between lamps for convenience.

Ballast Equipment. Standard two lamp, as described in Westinghouse Catalog Section 61-272, are used to provide high power factor of 95% to 99%, minimize cyclic flicker, and to assure satisfactory lamp performance.

Mounting—Units are arranged for rigid conduit, flexible conduit, or chain mounting. Two suspension brackets on hood with 46″ centers provide for vertical or angular chain mounting. Two ½″ knockouts on 30″ and 36″ centers provide for conduit mounting. A ½″ knockout is also provided in each end of the hood.

Wiring—Units are furnished completely wired. Unwired units supplied on special order include ballast assembled, unassembled sockets, lamp starters and full length leads of proper size wire.

Finish—The reflector is first completely covered by a ground coat of fused porcelain-enamel. The outside surface is then covered with fused gray porcelain enamel, and the entire reflecting surface with white porcelain-enamel. The hood is finished with a smooth silver gray baked enamel paint.

Approval—Units are approved by the Underwriters' Laboratories, Inc. and are so labeled.

Accessories

For 110-volt, single-pole Levolier switch add $1.00 to price of unit. For 220-volt, double-pole switch add $1.85. Units supplied with 6 feet of 3-wire rubber covered cord and plug add $1.20

COMPLETE UNITS—WIRED* 60-CYCLE†

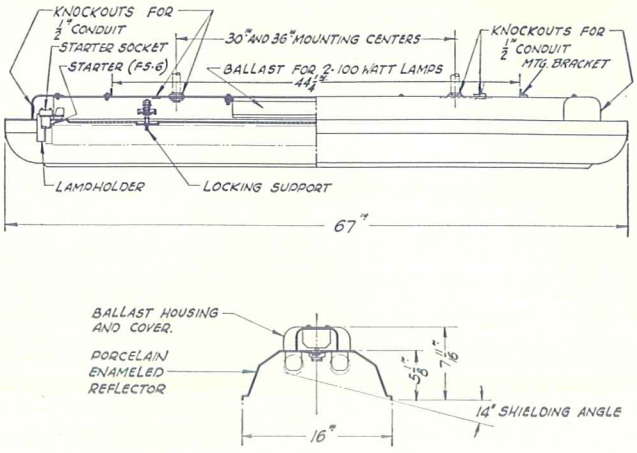
Luminaire Type	Lamps		Circuit Volts	Style No.**	Price**	Standard Package	
	Watts	Number				Quantity	Weight, Lb.
Totally Direct Type 2-FPR-100	100	2	110–125	1 121 935	$36 30	1	73
Totally Direct Type 2-FPR-100	100	2	199–216	1 121 936	36 30	1	73
Totally Direct Type 2-FPR-100	100	2	220–250	1 121 937	36 30	1	73
Diffuser Type 2-FPR-100	100	2	110–125	1 121 938	37 60	1	73
Diffuser Type 2-FPR-100	100	2	199–216	1 121 939	37 60	1	73
Diffuser Type 2-FPR-100	100	2	220–250	1 121 940	37 60	1	73
Accessories Safe Change Hanger, Two Wire				346 571	2 75	10	15
Accessories Swivel, ½″ Conduit				1 119 757	1 20	10	12

* Unwired units furnished on special order at a decrease in price of $0.75.
† 50-Cycle units available on special order for 115 or 230-volt circuits, prices furnished on request.
** Lamps not included.

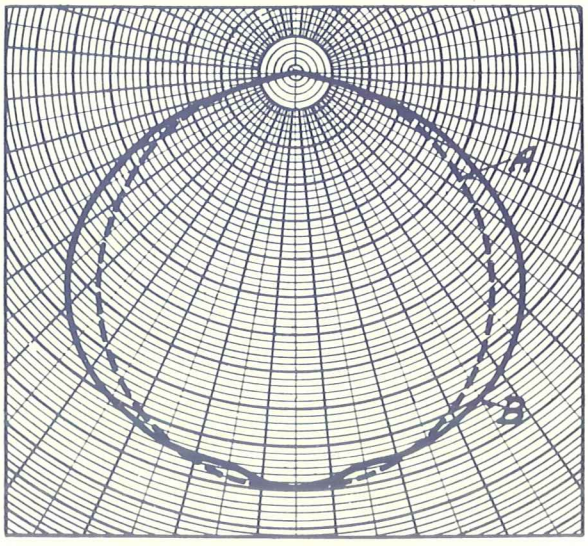
Prices are subject to change without notice.

Order by Style Number

ENGINEERING DATA



CONSTRUCTION OUTLINE OF FLUORESCENT LAMP LUMINAIRE



A. Parallel to Lamp
B. Normal to Lamp

TYPICAL DISTRIBUTION CURVES OF FLUORESCENT LUMINAIRE—SPREAD DISTRIBUTION

INSTALLATION DESIGN DATA
FOR TYPE 2-FPR-100 RLM FLUORESCENT LUMINAIRE

Mounting Height Above Floor (Feet)	Maximum Spacing (Feet)	Area Per Outlet (Sq. Ft.)	Room Proportion	Approx. Average* Footcandles On Working Plane 3' Above Floor; White Lamps	
				Direct Type	Diffuser Type
9	9 x 9	81	Favorable Average Unfavorable	51 43 34	52 45 35
10	10 x 10	100	Favorable Average Unfavorable	41 35	42 36
11	11 x 11	121	Favorable Average Unfavorable	29 22	30 23
12	12 x 12	144	Favorable Average Unfavorable	29 24 19	29 25 20
13	13 x 13	169	Favorable Average Unfavorable	24 21 16	25 21 17
14	14 x 14	196	Favorable Average Unfavorable	21 18 14	22 18 14
15	15 x 15	225	Favorable Average Unfavorable	18 16 12	19 16 13
16	16 x 16	256	Favorable Average Unfavorable	16 14 11	17 14 11
17	17 x 17	289	Favorable Average Unfavorable	14 12 9	15 13 10
18	18 x 18	324	Favorable Average Unfavorable	13 11 8	13 11 9

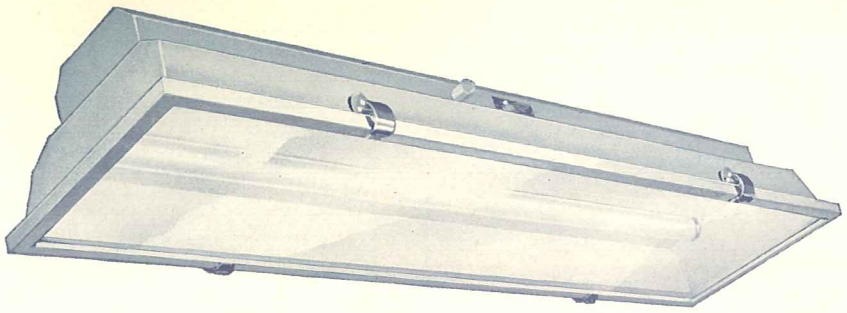
Use at least 10' mounting height wherever possible.

ROOM PROPORTIONS—Use **Favorable** when room width equals four times **mounting height.**
Use **Average** when room width equals two times **mounting height.**
Use **Unfavorable** when room width is equal to **mounting height.**

Footcandle values are calculated on the basis of recommended reflection factors of ceiling and wall, and include allowance for normal depreciation.

* When used with 100 watt Daylight Fluorescent Mazda "F" Lamps multiply values by .80.

GLASS COVERS FOR FLUORESCENT LUMINAIRES



TYPICAL ASSEMBLY OF GLASS COVER ON TYPE 2FP-40 FLUORESCENT LUMINAIRE

Glass covers are available for attachment to types FP and FPS RLM Fluorescent Luminaires to provide for simple cleaning of units when installed in smoky or dusty areas, increase diffusion with opal glass for more critical seeing tasks, and for protection when using heat and impact-resisting glass.

Construction

The complete cover assembly consists of a cover frame, four spring holding latches, glass panel and gasket.

Cover Assembly—Heavy rolled steel channel with glass-holding clips, hinge and catch plates are welded in one continuous frame.

Holding Latch—Formed from special heat-treated steel strap and designed to securely hold entire cover assembly in tight suspension with the reflector, insuring a definite seal between reflector-face and cover.

Glass Panels—A choice of glass panels, depending on requirements, is available. The plain clear, clear ribbed and opal glass panels are double strength, non-heat-resisting glass, while the ¼" thick heat and impact resisting panels should be used under more severe conditions.

The heat and impact resisting glass is clear and highly polished with more than 90% transmission. It withstands sharp temperature changes and extreme impacts. If broken, it shatters into small, dull fragments, rather than splitting into large sharp pieces that may cause serious injuries.

Gasket—Double action, soft rubber gasket is forced in place in channel to provide positive seal with glass panel and reflector.

Finish—Complete assembly is finished with a smooth silver-gray baked enamel.

Reflector and Hood—See Catalog Section 61-152, Pages 3, 4, 13 and 14.

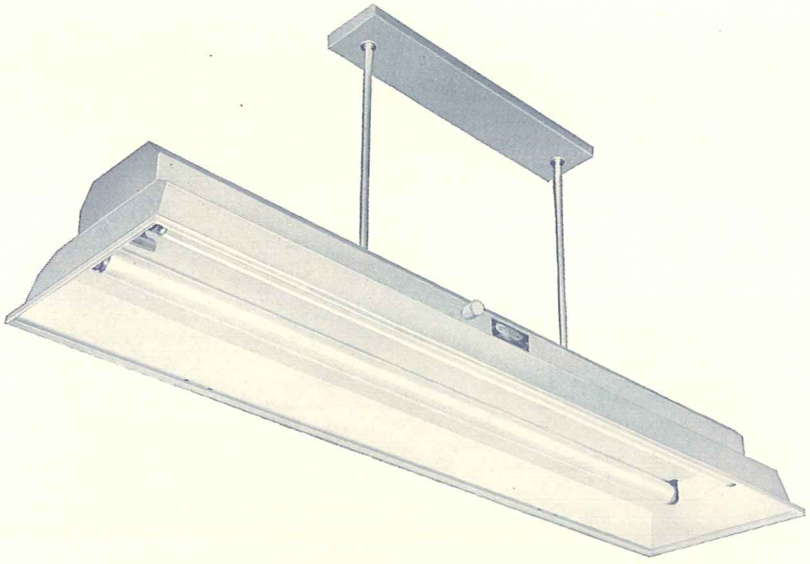
COMPLETE GLASS COVER ASSEMBLIES AND PARTS

Description	Style Number	Price	Dimensions In Inches		Standard Package	
			Length	Width	Quantity	Approx. Wgt. Lbs.
Complete Assembly, Clear Glass	1 121 901	$12.00	53	13¼	1	18
Complete Assembly, Clear Ribbed Glass	1 121 902	12.00	53	13¼	1	18
Complete Assembly, Opal Glass	1 121 903	14.60	53	13¼	1	18
Complete Assembly, Heat and Impact-Resisting Glass	1 121 904	28.80	53	13¼	1	25
Clear Glass Only	1 121 896	2.40	..	....	1	11
Clear Ribbed Glass Only	1 121 897	2.40	..	....	1	11
Opal Glass Only	1 121 898	6.00	..	....	1	11

Prices are subject to change without notice.

Order by Style Number

TWIN-STEM SUSPENSION HANGER



Westinghouse Twin-Stem Suspension Hanger provides an attractive means of suspending, from a single outlet box, Type FP, Type FPR and Type FPS Fluorescent Luminaires.

Construction

The hanger assembly consists of a suspension bridge, ceiling plate, two stems and self-aligning swivels.

Suspension Bridge—Heavy U-shaped steel bridge equipped with running thread nipple and ⅜″ female hickey for mounting on ⅜″ outlet box stud.

Ceiling Plate—Rectangular steel ceiling plates are supported by two knurled rings on the swivels which slip down over stems to afford free access for wiring and installation. A knockout is provided on one side for canopy switch.

Stems—One-piece seamless steel tubing ½″ O.D. and threaded ¼″ I.P.S. at both ends. Upper end is threaded and locked into suspension swivels which are spaced 17¾″ apart on centers and supported by the suspension bridge. Lower end is threaded to take locknuts supplied to hold fixture which has proper knockouts on top of hood.

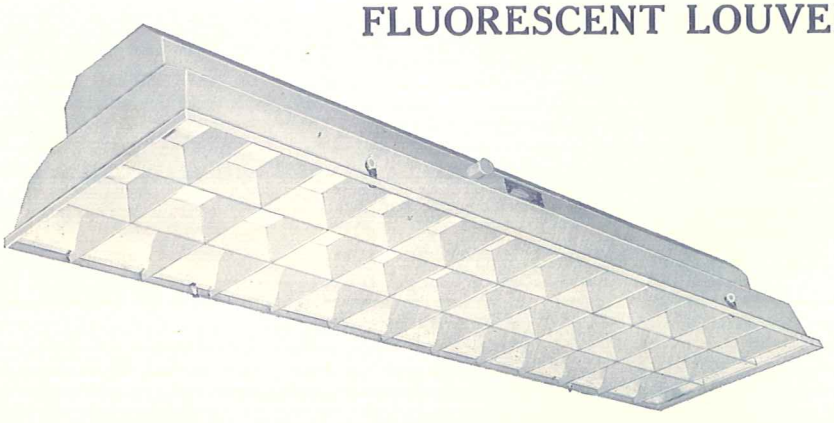
Aligner Swivels—Socket-ball type steel free turning swivels have top half arranged to engage bridge and lower half tapped for stems.

Finish—Ceiling plate and stems are neutral Pearlite finish to blend with gray of fixture.

Reflector and Hood—See Catalog Section 61-152, Pages 3, 4, 13 and 14.

Description	Style Number	Price	Standard Suspended Length Inches	Ceiling Plate Dimension In Inches			Standard Package	
				Length	Width	Depth	Quantity	App. Wgt. Lbs.
Twin-Stem Hanger.....	1 217 137	$4.40	29	20¾	4¼	⅞	2	12

FLUORESCENT LOUVERS



Westinghouse Fluorescent Louvers can be attached to Types 2FP-40, 3FP-40 and FPS-40 closed end Fluorescent Luminaires to improve shielding of the lamp brightness for certain applications.

The steel louver blades are arranged to provide maximum efficiency with approximately 23° shielding angle when viewed in any direction. The louver is securely held in place by two spring-type supports on each side of the reflector. Finish is matte white, baked-on enamel.

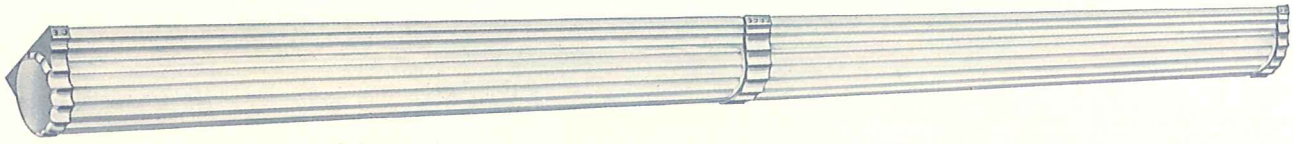
Reflector and Hood—See Catalog Section 61-152, Pages 3, 4, 13 and 14.

Description	Style Number	Price	Dimensions In Inches		Standard Package	
			Length	Width	Quantity	App.Wgt. Lbs.
Louver for Types 2FP-40, 3FP-40 and FPS-40	1 122 572	$5.00	52	12⅞	2	14

Order by Style Number

FLUORESCENT LIGHTING

SURFACE MOUNTING TYPE CL-40 AND 2-CL-40



Application

Westinghouse Types CL-40 and 2-CL-40 Fluorescent Surface mounting Luminaires are suitable for general Commercial Lighting installations.

Construction

There are three classifications of the CL-40 Luminaires, various combinations of which may be used depending on the total strip length desired.

CL-40—Single-lamp luminaire complete with high power factor ballast equipment; assembled complete.

2-CL-40—Two-lamp luminaire complete with high power factor, two-lamp ballast equipment; assembled complete.

2-CL-40—Two-lamp luminaire extension complete with two-lamp high power factor ballast equipment; assembled complete. For use as continuous strip lighting.

End Caps and Connectors—The end caps and center connectors are attractive design zinc alloy die castings which support the glass sections.

Glass Sections—The glass sections, one of which is necessary for each lamp, are elongated semi-cylindrical sections of fluted Alvax glass. The glass, although translucent, has extremely high transmission qualities and possesses sufficient opacity to conceal the functional parts of the luminaire. The glass is held in position in the end caps by a pressure spring which permits quick and simple removal and replacement.

Reflector—V-shaped reflector accurately formed from heavy gauge steel and finished with two coats of baked white semi-glossy enamel. Each lamp requires an individual reflector.

Ornamental Runner—The runner is designed to act as a wire raceway, glass holder and complete support for the ballasts, reflector, starter switches, sockets and ornamental end caps.

Mounting—Six knockouts for ½" conduit and eight slots are provided in each 48" runner for surface mountings. All mounting provisions are conveniently located and properly positioned to make attachment to flexible conduit, rigid conduit or outlet box extremely simple.

At each end of the runner is a steel socket support, one for the starter switch and socket and the other for the socket only.

Assembly—Any length continuous run in multiples of four feet may be assembled by using one standard 2-CL-40 unit and the required number of CL extensions. This is accomplished by removing one end cap from the 2-CL-40, adding in the extensions and placing the end cap on the final extension at the end of the run.

Wiring—Units are furnished assembled and wired complete.

Finish—All exposed metal parts are finished with a satin, bone-white, baked enamel.

Lamp Holder—The lamps are held in position by sockets which are sturdy Bakelite, straight push contacting type supported by a bracket attached to the runner.

Lamp Starter—Consists of a metal container which fits a bayonet connection in the starter socket. The unit contains a glow switch and a condenser to minimize radio interference. It may be replaced as readily as the lamp itself.

Ballast Equipment—Standard high power-factor current limiting devices are included with the fixtures.

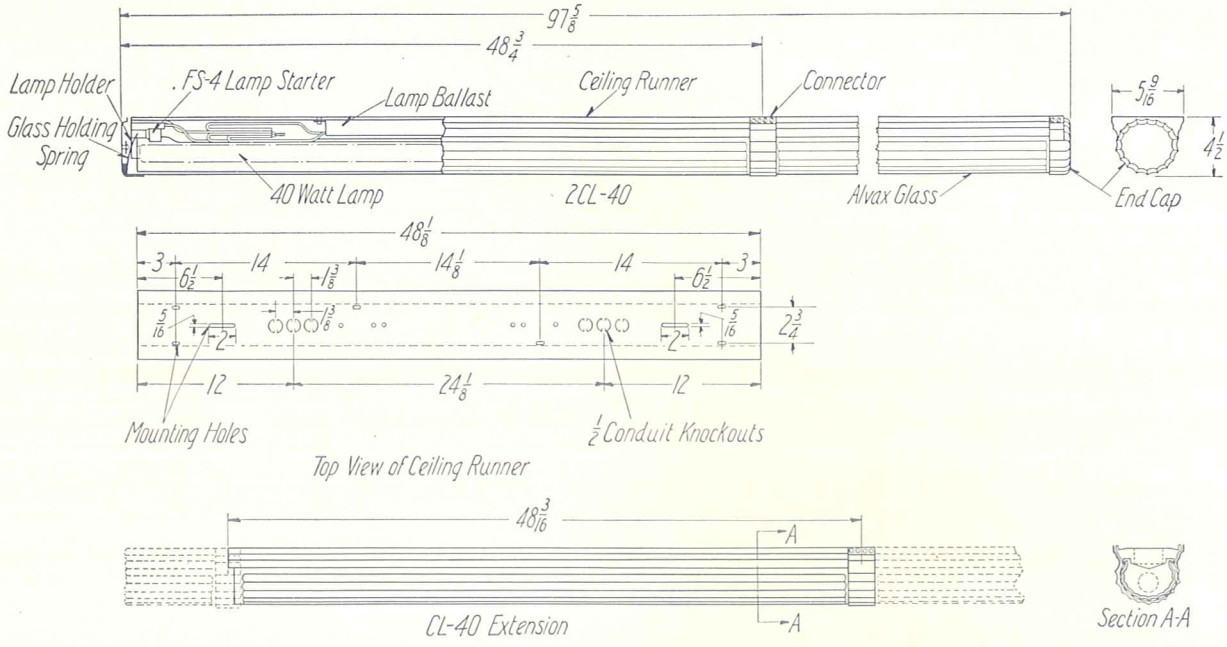
Approval—Luminaires are approved by Underwriters' Laboratories, Inc., and are so labeled.

TYPE CL-40 UNITS—WIRED—60-CYCLE

Luminaire Type	Description	Lamps†		Circuit Volts	Style No.	Price	Dimensions in Inches		
		Watt	No.				Length	Width	Depth
CL-40	Single-Lamp Complete Unit	40	1	110-125	1 121 300	$19 55	49½	5 9/16	4½
2-CL-40	Two Lamp Complete Unit	40	2	110-125	1 121 492	35 55	97½	5 9/16	4½
2-CL-40 Extension	Two Lamp Unit‡	40	2	110-125	1 121 460	33 75	96 5/16	5 9/16	4½
.....	Glassware	..	..	... ...	1 121 309	7 55	....	....	....

† Lamps are not included with fixtures.
‡ Does not include end caps.

ENGINEERING DATA



INSTALLATION DESIGN DATA FOR CL-40 LUMINAIRES

Spacing Between Strips (Feet)	Ceiling Height (1)	Area Per Lamp (Sq. Ft.) (2)	Room Proportions (3)	Average Footcandles On Working Plane With White Lamps (4)
3	Refer to footnote at bottom of page	12	Favorable Average Unfavorable	70 53 40
3½		14	Favorable Average Unfavorable	60 47 33
4		16	Favorable Average Unfavorable	52 42 30
4½		18	Favorable Average Unfavorable	47 37 26
5		20	Favorable Average Unfavorable	42 33 23
5½		22	Favorable Average Unfavorable	38 30 21
6		24	Favorable Average Unfavorable	35 27 20

(1) **Ceiling Height**—CL-40 luminaires are recommended for ceilings of 8′-12′ in small rooms and 8′-16′ in large rooms to obtain high utilization lighting.

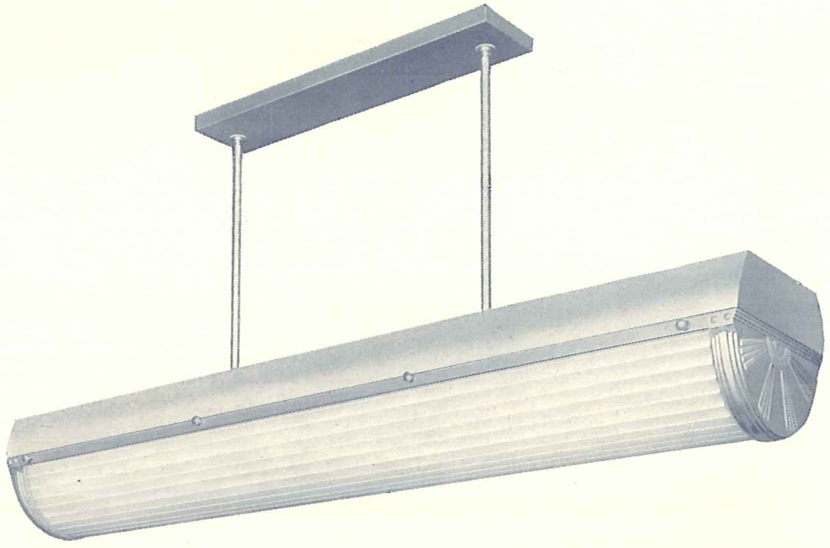
(2) **The Area Per Lamp** given is calculated on the assumption that luminaires will extend the full length of the room, that is from wall to wall. If strips are shorter than length of room, area per lamp will be increased and footcandles will be proportionately reduced.

(3) **Room Proportions:**
Use **favorable** when room width equals four or more times **ceiling height.**
Use **average** when room width equals two times **ceiling height.**
Use **unfavorable** when room width is equal to **ceiling height.**

(4) **Footcandle Values** are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation.
When used with daylight Mazda Fluorescent lamps, multiply footcandle values by .81.

FLUORESCENT LIGHTING

SURFACE OR SUSPENSION MOUNTING TYPE CL-110 LUMINAIRE



Application

Westinghouse Type CL-110 Fluorescent Luminaires are suitable for general applications, such as stores, offices and public buildings, and are available for both suspension and ceiling mounting. The suspension type unit is provided with either two or three 40-watt lamps for direct illumination, and either with or without a 30-watt lamp for indirect illumination.

Construction

Fixture Body—All steel, semi-cylindrical metal frame with decorative die cast ends. One semi-cylindrical section of fluted Alvax glass is supported by the frame to diffuse the light. This glass, although translucent, has extremely high transmission qualities and possesses sufficient opacity to conceal the functional parts of the luminaire. The entire under-section hinges down to facilitate relamping. Either ceiling or suspension luminaires are available as complete units without glass.

Suspension Bridge—Heavy, U-shaped steel bridge, equipped with adjustable nipple and hickey mounts directly on ⅜″ stud in outlet box for single-point mounting of the suspension type luminaire. Hanger stems are assembled at each end of the suspension bridge.

Ceiling Plate—Rectangular steel ceiling plate, supported by knurled nuts on stem adapters, slips down over stems to afford free access for wiring and installation.

Stems—One-piece tubing threaded ¼″ I.P.S. at both ends. Upper end threads into suspension adapter and lower end into fixture support, with provision for adjustment to level fixture after installation.

Lamp Holder—Sturdy Bakelite push-type lamp holder.

Lamp Starter—Standard FS-4 starter switch with condenser to minimize radio interference. Starters are enclosed in metal containers with bayonet contacts, and are easily accessible for replacement.

Ballast Equipment—Standard Westinghouse current limiting devices are used. Two-lamp ballasts with built-in compensators provide high power factor of 90%-99%, minimize cyclic flicker and assure satisfactory lamp life.

Mounting—Both suspension and ceiling units are supplied with two knock-outs in each end, permitting continuous strip installations of either type. No connecting nipples or lock-nuts are furnished. Ceiling units are arranged with slots in the housing to permit surface mounting.

Wiring—Units are completely wired, except line leads which are furnished for line connections in suspension units.

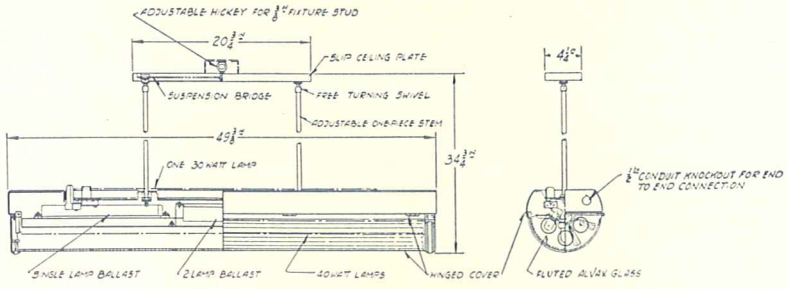
Finish—All exposed metal parts of the suspension type are finished with a special, baked-on silver-gray enamel and a clear top coating. The ceiling units have a bake-on white finish.

TYPE CL-110 UNITS—WIRED—60-CYCLE

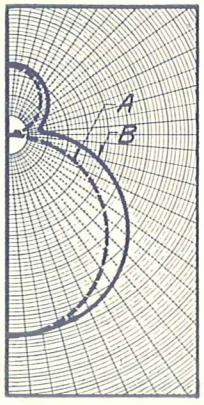
Description	Lamps *		Circuit Volts	Style No.	Price	Dimensions in Inches		
	Watts	No.				Length	Width	Overall Suspension Length
Suspension with glass	40	2	110–125	1 217 072	$30 10	49⅜	8¾	34¾
Suspension less glass	40	2	110–125	1 217 073	22 90	49⅜	8¾	34¾
Suspension with glass	40	3	110–125	1 217 074	39 00	49⅜	8¾	34¾
Suspension less glass	40	3	110–125	1 217 075	31 70	49⅜	8¾	34¾
Suspension with glass	40 30	2 1	110–125	1 217 076	34 40	49⅜	8¾	34¾
Suspension less glass	40 30	2 1	110–125	1 217 077	27 10	49⅜	8¾	34¾
Suspension with glass	40 30	3 1	110–125	1 217 078	44 30	49⅜	8¾	34¾
Suspension less glass	40 30	3 1	110–125	1 217 079	37 00	49⅜	8¾	34¾
Ceiling with glass	40	2	110–125	1 217 080	29 30	49⅜	8¾	7⅜
Ceiling less glass	40	2	110–125	1 217 081	22 00	49⅜	8¾	7⅜
Ceiling with glass	40	3	110–125	1 217 082	38 10	49⅜	8¾	7⅜
Ceiling less glass	40	3	110–125	1 217 083	30 80	49⅜	8¾	7⅜
Glassware only	..	..	... ...	1 122 773	10 00	....	...	....

* Lamps are not included with fixtures.

ENGINEERING DATA



CONSTRUCTION OUTLINE FLUORESCENT LAMP LUMINAIRES



A—Parallel to Lamp Axis
B—Normal to Lamp Axis
TYPICAL DISTRIBUTION CURVE

INSTALLATION DESIGN DATA FOR TYPE CL-110 LUMINAIRES

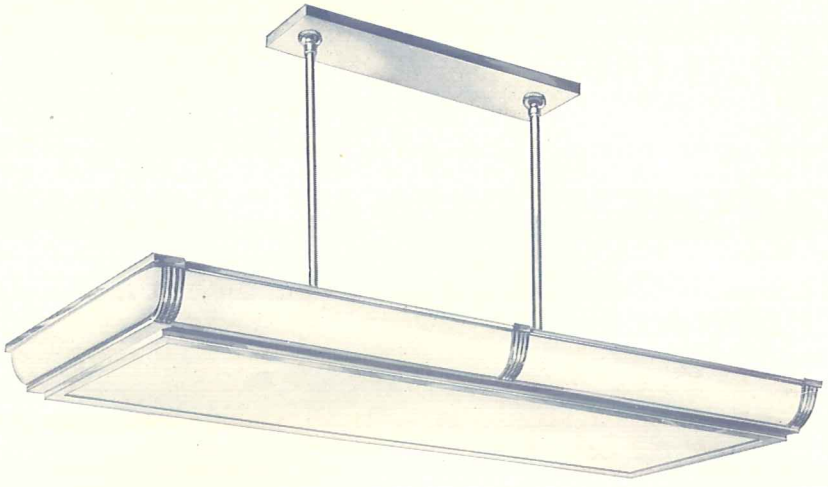
Ceiling Height	Room Proportions	SUSPENSION MOUNTING UNITS									
		Rec. Min. Mounting Height	Approx. Spacing	Area Per Outlet	FOOTCANDLES *							
					WITH 30-WATT LAMP ON TOP				WITHOUT 30-WATT LAMP ON TOP †			
					WITH GLASS		WITHOUT GLASS		WITH GLASS		WITHOUT GLASS	
					2 LP.	3LP.	2LP.	3LP.	2LP.	3LP.	2LP.	3LP.
8′	Favorable Average Unfavorable	For ceilings under 10′ use ceiling mounting units	.....	...	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..
9′	Favorable Average Unfavorable	For ceilings under 10′ use ceiling mounting units	.....	...	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..	.. .. ..
10′	Favorable Average Unfavorable	8′	6′ x 8′	48	40 34 25	55 45 32	48 39 27	66 53 39	34 28 20	47 39 28	40 33 24	58 47 34
11′	Favorable Average Unfavorable	8′9″	8′ x 8′ or 7 x 9′	64	30 26 19	41 34 24	36 29 20	50 40 29	26 21 15	35 30 21	30 25 18	43 35 27
12′	Favorable Average Unfavorable	9′	9′ x 9′ or 8′ x 10′	80	24 20 15	33 27 19	29 23 16	40 32 23	20 17 12	28 24 17	24 20 14	35 28 20
13′	Favorable Average Unfavorable	10′	10′ x 10′ or 9′ x 11′	100	19 16 12	26 22 16	23 19 13	32 26 19	16 13 10	23 19 13	19 16 11	28 23 16
14′	Favorable Average Unfavorable	10′6″	11′ x 11′ or 10′ x 12′	120	16 14 10	22 18 13	19 16 11	27 21 15	14 11 8	19 16 11	16 13 10	23 19 14
15′	Favorable Average Unfavorable	11′6″	12′ x 12′	144	13 11 8	18 15 11	16 13 9	22 18 13	11 9 7	16 13 9	13 11 8	19 16 11

* When CL-110 Luminaires are to be installed in continuous strips, average footcandles may be determined by calculating average area per unit and then refer to footcandle values opposite this area in table above.

† Use these same values for ceiling mounted units and consider recommended minimum mounting height as ceiling height.

FLUORESCENT LIGHTING

FOUR-LAMP, SEMI-INDIRECT—TYPE CL-160



Application

Westinghouse Type CL-160 Fluorescent Luminaires are suitable for general Commercial Lighting installations such as in offices, stores and public buildings.

Construction

Suspension Bridge—Heavy U-shaped steel bridge equipped with adjustable nipple and hickey mounts directly on ⅜" stud in outlet box for single-point mounting. Free turning swivel stems at each end of the bridge provide for attachment of fixture body.

Ceiling Plate—Rectangular steel ceiling plate supported by knurled rings on the swivels slips down over stems to afford free access for wiring and installation.

Stems—One-piece, seamless tubing threaded ¼" I.P.S. at both ends. Upper end is threaded and locked into suspension swivel and lower end into the fixture support with provision for adjustment to level fixture after it is hung.

Fixture Body—Open-top metal frame is heavy steel with decorative die cast ends. Side panels are curved Monax diffusing glass. Steel hinged door assembly on under side of fixture body may be equipped with clear ribbed glass panel or decorated ribbed glass panel. A louver assembly is interchangeable with the door assembly.

Louvers—Type CL-160 units with louvers give approximately 30% of direct and 70% indirect light with maximum shielding of lamps.

Clear Ribbed Glass—Type CL-160 units with clear ribbed glass panel give 75% indirect light and add diffusion to the direct light.

Decorated Ribbed Glass—Type CL-160 units with decorated ribbed glass panel give 78% indirect light and maximum diffusion of the direct light.

Lamp Holder—Sturdy Bakelite straight-push contacting type.

Lamp Starter—Standard FS-4 Starter Switch with condenser to minimize radio interference. Starters are enclosed in metal containers with bayonet type contacts and are easily accessible for replacement.

Ballast Equipment—Standard Westinghouse current limiting devices in special case with built-in compensators provide high power factor of 95%-99%, minimize cyclic-flicker and assure satisfactory lamp life. Capacitors are easily removable for replacement, or complete ballast may be removed and replaced without taking down or dismantling the complete unit.

Wiring—Units are completely wired except line leads which are furnished for line connections.

Finish—Baked-on silver-gray enamel with a clear top coating is provided on all exposed metal parts.

Approval—Luminaires are approved by the National Board of Fire Underwriters, and are so labeled.

TYPE CL-160 UNITS—WIRED—60-CYCLE

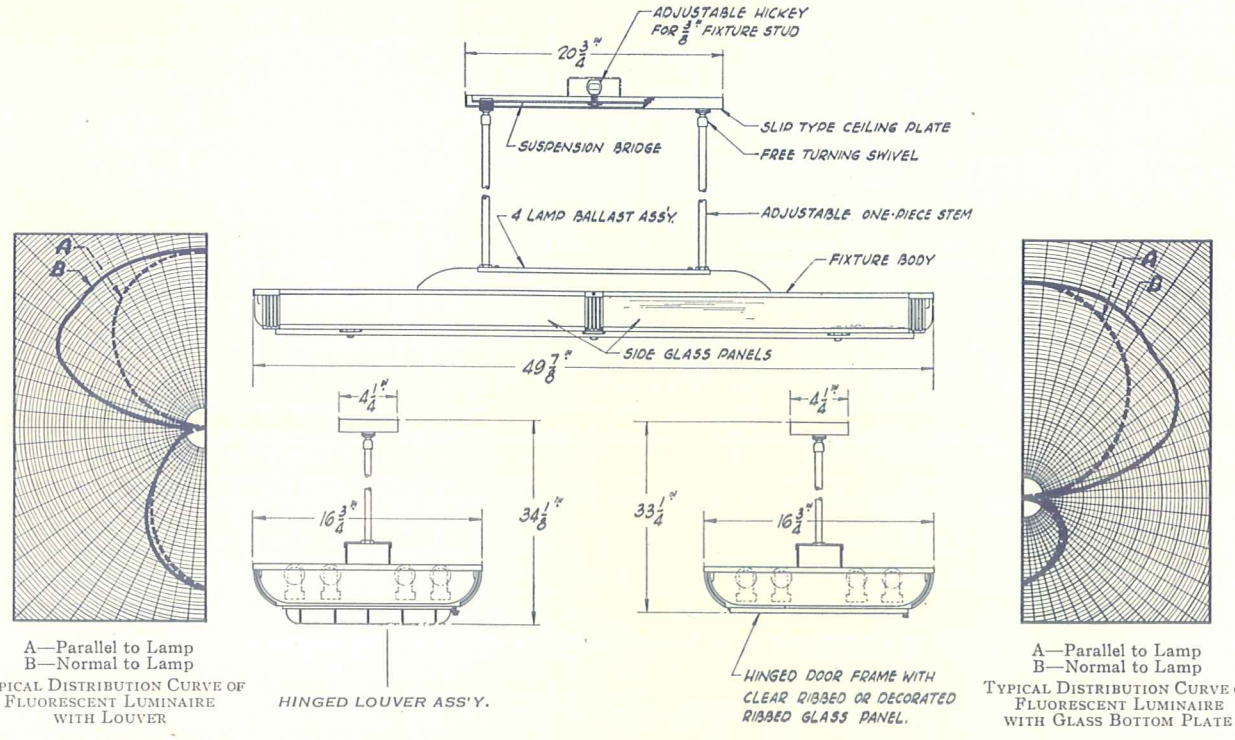
Luminaire Type	Description	Lamps*		Circuit Volts	Style No.	Price	Dimensions in Inches		
							Fixture		Over-all Suspension Length
		Watts	Number				Length	Width	
CL-160	Louver Bottom	40	4	110-125	1 121 252	$53 35	49⅞	16¾	34⅛
CL-160	Clear Ribbed Glass Bottom	40	4	110-125	1 121 253	53 35	49⅞	16¾	33¼
CL-160	Decorated Ribbed Glass Bottom	40	4	110-125	1 121 254	56 90	49⅞	16¾	33¼
.....	Louver only	..	..	.....	1 121 117	6 20	...	....	....
.....	Clear Ribbed Glass Bottom Panel	..	..	.....	1 121 119	1 65	...	....	....
.....	Decorated Ribbed Glass Bottom Panel	..	..	.....	1 121 120	4 45	...	....	....

*Lamps are not included with fixtures

Prices are subject to change without notice

Order by Style Number

ENGINEERING DATA



A—Parallel to Lamp
B—Normal to Lamp
TYPICAL DISTRIBUTION CURVE OF FLUORESCENT LUMINAIRE WITH LOUVER

A—Parallel to Lamp
B—Normal to Lamp
TYPICAL DISTRIBUTION CURVE OF FLUORESCENT LUMINAIRE WITH GLASS BOTTOM PLATE

CONSTRUCTION OUTLINE FLUORESCENT LAMP LUMINAIRES

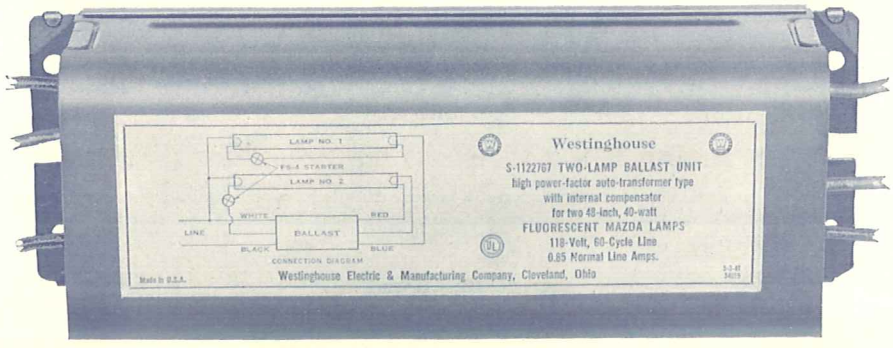
INSTALLATION DESIGN DATA

Westinghouse Semi-Indirect Fluorescent Luminaires—Type CL-160

Ceiling Height	Mounting Height	Recommended Spacing	Area Per Outlet (Sq. Ft.)	Room Proportions	Approximate Average Footcandles—White Lamps*		
					With Louver	With Clear Ribbed Glass	With Decorated Ribbed Glass
10′	8′	6′ x 8′	48	Favorable Average Unfavorable	56 44 32	60 47 38	55 43 35
11′	8′9″	7′6″ x 8′6″	64	Favorable Average Unfavorable	43 33 25	46 35 29	42 32 27
12′	9′	9′ x 9′ or 8′ x 10′	80	Favorable Average Unfavorable	33 26 20	36 28 23	33 26 21
13′	10′	10′ x 10′ or 9′ x 11′	100	Favorable Average Unfavorable	27 21 16	29 22 18	27 21 17
14′	10′6″	11′ x 11′ or 10′ x 12′	120	Favorable Average Unfavorable	22 17 13	24 18 15	22 17 14
15′	11′6″	12′ x 12′	144	Favorable Average Unfavorable	19 14 11	20 15 13	18 14 12
16′	12′6″	13′ x 13′	169	Favorable Average Unfavorable	16 12 9	17 13 11	16 12 10

ROOM PROPORTIONS
Use **Favorable** when room width equals four times **ceiling height.**
Use **Average** when room width equals two times **ceiling height.**
Use **Unfavorable** when room width is equal to **ceiling height.**
Footcandle values are calculated on the basis of recommended reflection factors of ceiling and walls, and include allowance for normal depreciation.
* When used with daylight fluorescent Mazda lamps, multiply values by .81.

FLUORESCENT TWO-LAMP BALLAST UNITS



TYPICAL TWO-LAMP BALLAST UNIT FOR FLUORESCENT LAMPS

Application

Westinghouse Two-Lamp Fluorescent Ballast Units with Internal Compensator are designed to regulate the operation of two Fluorescent lamps.

One ballast of proper characteristics will operate two identical Fluorescent lamps. The ballasts are designed for alternating current operation only. All ballasts are intended for use in conjunction with FS socket-type starting switches.

Construction

These high power-factor Two-Lamp Ballasts make use of the "split-phase" principle in which one lamp is regulated with a reactor only and the other lamp by a reactor and a capacitor connected in series. The lagging power-factor of the reactor side offsets the leading power-factor of the capacitor side, and the result is an overall power-factor of 95% or better. The phase displacement of the current in the two branches results in a practical elimination of stroboscopic flicker effect when the lamps are placed in close proximity side by side.

The essential elements of a Two-Lamp Ballast Unit are an auto-transformer, two reactors, a capacitor connected in series with one of the reactors, and the starting compensator.

Noise during operation is reduced to a minimum by the rigid and compact assembly of the core and coils, plus a thorough impregnation of these before finally being placed in the case and covered completely with compound.

Lead Wires—The lead wires are #18 gauge, stranded copper wire with high temperature rubber insulation and of sufficient length to make direct connections to the lamp sockets.

Power-Factor—Because of the reactance branch with the lagging power-factor and the capacitance branch with the leading power-factor counterbalancing one another, the overall result is from 95% to unity.

All 60 cycle two-lamp ballast units are approved by the National Board of Fire Underwriters.

Installation

The Two-Lamp Ballast is provided with mounting lugs so that it may be installed in any convenient place which will accommodate its dimensions. This may be either in a space provided within or on the fixture itself, or in a concealed recess in the ceiling.

All ballasts are made for indoor use, and when used out-of-doors they must be protected from the weather.

TWO-LAMP BALLASTS WITH INTERNAL COMPENSATORS

Lamp Size Inches	Lamp Watts	Approx. Line Voltage	Power Factor	Style No. 60 Cycles	List Price 60 Cycles	Style No. 50 Cycles	List Price 50 Cycles	Std. Pkg. Qty.	Wt. Lbs. Per Std. Pkg.	
									60 Cycles	50 Cycles
18	2–15	110–125	95–100	1 120 835	$3 90	1 121 205	$5 50	20	38	39
24	2–20	110–125	95–100	1 120 836	3 90	1 121 206	5 50	20	38	39
36	2–30	110–125	95–100	1 217 118	5 30	1 217 121	6 80	10	75	76
36	2–30	199–216	95–100	1 217 119	5 30	1 217 122	6 80	10	70	71
36	2–30	220–250	95–100	1 217 120	5 30	1 217 123	6 80	10	70	71
48	2–40	110–125	95–100	1 122 767	5 30	1 122 770	6 80	10	75	76
48	2–40	199–216	95–100	1 122 768	5 30	1 122 771	6 80	10	70	71
48	2–40	220–250	95–100	1 122 769	5 30	1 122 772	6 80	10	70	71

Sockets and Starters are available from the Bryant Electric Company, Bridgeport, Connecticut.
Lamps—Fluorescent Mazda lamps are available from Westinghouse Electric & Manufacturing Company, Bloomfield, N. J.

Order by Style Number

ENGINEERING DATA

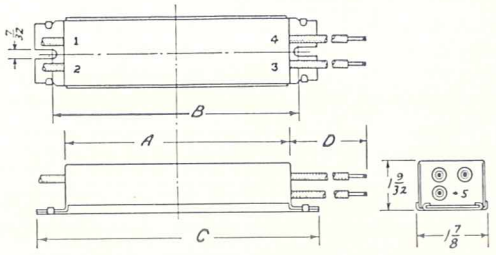


FIG. 1

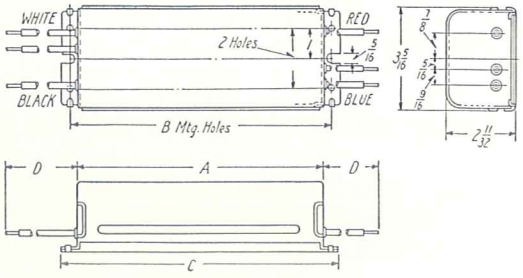


FIG. 2

TWO-LAMP BALLAST UNITS WITH INTERNAL COMPENSATORS

Style No.	Dimensions and Wiring	Approx. Line Current	Approx. Watts Loss	Dimensions in Inches			
				A	B	C	D
60 Cycles							
1 120 835	Fig. 1 & B	.35	9	13 3/16	13 11/16	14 11/16	15–10*
1 120 836	Fig. 1 & B	.43	9	13 3/16	13 11/16	14 11/16	21–10*
1 217 118	Fig. 2 & A	.66	14.5	8 5/16	8 7/8	9 7/16	30
1 217 119	Fig. 2 & A	.36	12	8 5/16	8 7/8	9 7/16	30
1 217 120	Fig. 2 & A	.31	12.5	8 5/16	8 7/8	9 7/16	30
1 122 767	Fig. 2 & A	.86	17.5	8 5/16	8 7/8	9 7/16	30
1 122 768	Fig. 2 & A	.48	14.5	8 5/16	8 7/8	9 7/16	30
1 122 769	Fig. 2 & A	.42	14.5	8 5/16	8 7/8	9 7/16	30
50 Cycles							
1 121 205	Fig. 1 & B	.34	10	13 3/16	13 11/16	14 11/16	15–10*
1 121 206	Fig. 1 & B	.43	10	13 3/16	13 11/16	14 11/16	21–10*
1 217 121	Fig. 2 & A	.66	15	8 5/16	8 7/8	9 7/16	30
1 217 122	Fig. 2 & A	.36	13	8 5/16	8 7/8	9 7/16	30
1 217 123	Fig. 2 & A	.31	18.5	8 5/16	8 7/8	9 7/16	30
1 122 770	Fig. 2 & A	.86	13	8 5/16	8 7/8	9 7/16	30
1 122 771	Fig. 2 & A	.47	15	8 5/16	8 7/8	9 7/16	30
1 122 772	Fig. 2 & A	.42	15	8 5/16	8 7/8	9 7/16	30

* Compensator Lead—#2—10 inches long.

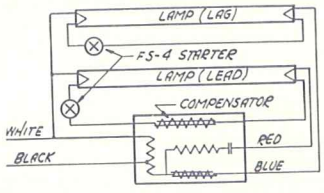


FIG. A—CONNECTION DIAGRAM FOR TWO-LAMP HIGH POWER-FACTOR REACTOR BALLAST UNIT WITH INTERNAL COMPENSATOR, AND SEPARATE GLOW STARTERS

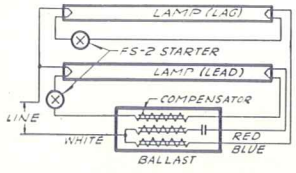


FIG. B—CONNECTION DIAGRAM FOR TWO-LAMP HIGH POWER-FACTOR REACTOR BALLAST UNIT WITH SEPARATE GLOW STARTER AND BUILT-IN COMPENSATOR

FLUORESCENT 100-WATT BALLAST UNITS

TYPICAL 100-WATT BALLAST UNIT FOR FLUORESCENT LAMPS

Application

Two-Lamp Ballast—Westinghouse Fluorescent Two-Lamp Ballast Units are designed to regulate the operation of two Fluorescent lamps. The ballasts are designed for alternating current operation only. All ballasts are intended for use in conjunction with FS socket-type starting switches.

Single-Lamp Ballast—Westinghouse Fluorescent Single-Lamp Ballast Units are designed to regulate the operation of one Fluorescent lamp. One ballast of proper characteristics must be used. The ballasts are designed for alternating current use only. All ballasts are intended for use in conjunction with FS socket-type switches.

Construction

Two-Lamp Ballast—These ballasts make use of the "split-phase" principle in which one lamp is regulated with a reactor only and the other lamp by a reactor and capacitor connected in series. The lagging power factor of the reactor side offsets the leading power-factor of the capacitor side, resulting in an overall power-factor of 95% or better. The phase displacement of the current in the two branches results in a practical elimination of stroboscopic flicker effect when the lamps are placed in close proximity, side by side. The essential elements of a Two-Lamp Ballast Unit are an auto-transformer, two reactors and a capacitor connected in series with one of the reactors.

Single-Lamp Ballast—These ballasts are furnished in all standard voltage ranges for high power-factor operation. They are sturdy and compact and are built complete in attractive compound-filled cases. The essential elements are a reactor or transformer, and a capacitor for power-factor correction.

Noise during operation of all ballasts is reduced to a minimum by the rigid and compact assembly of the core and coil, plus a thorough impregnation of these before finally being placed in the case and completely covered with compound.

Lead Wires—The lead wires are #18 gauge, stranded copper wire with high temperature rubber insulation and of sufficient length to make direct connections to lamp sockets.

Power-Factor—For Two-Lamp Ballasts, the reactance branch with lagging power factor and the capacitance branch with leading power-factor counter-balance each other, resulting in 95-100% power factor.

For Single-Lamp Ballasts, 90% or better power factor is obtained with a capacitor in the circuit to offset the lagging power-factor of the transformer.

Frequency—Both Two-Lamp and Single-Lamp Ballasts are furnished for all standard voltage ranges for either 50 or 60-cycle operation.

Approval—All 60-cycle ballasts are approved by the National Board of Fire Underwriters.

Installation

All ballasts have mounting lugs which permit convenient installation in standard locations. All units are made for indoor use, and when used out-of-doors, must be protected from the weather.

Lamp Size Inches	Lamp Watts	Line Voltage	Approx. Power Factor	Style No. 60 Cycles	List Price 60 Cycles	Style No. 50 Cycles	List Price 50 Cycles	Wt. Lbs. per Standard Pkg. Qty. of 4	
								60 Cycles	50 Cycles
Two-Lamp Ballasts									
60	2–100	110–125	95–100	1 121 819	$12 00	1 121 828	$15 75	68	70
60	2–100	199–216	95–100	1 121 820	12 00	1 121 829	15 75	68	70
60	2–100	220–250	95–100	1 121 821	12 00	1 121 830	15 75	68	70
Single-Lamp Ballasts									
60	1–100	110–125	90–95	1 121 813	8 00	1 121 825	11 00	44	46
60	1–100	199–216	90–95	1 121 814	8 00	1 121 826	11 00	44	46
60	1–100	220–250	90–95	1 121 815	8 00	1 121 827	11 00	44	46

Sockets and Starters are available from the Bryant Electric Company, Bridgeport, Conn.
Lamps—Fluorescent Mazda lamps are available from Westinghouse Electric & Manufacturing Company, Bloomfield, N. J.

Order by Style Number

Prices are subject to change without notice

ENGINEERING DATA

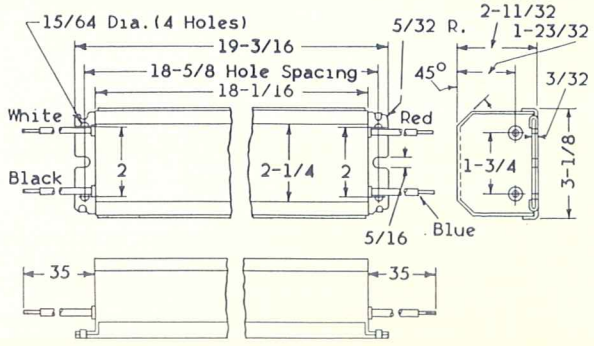


FIG. 9

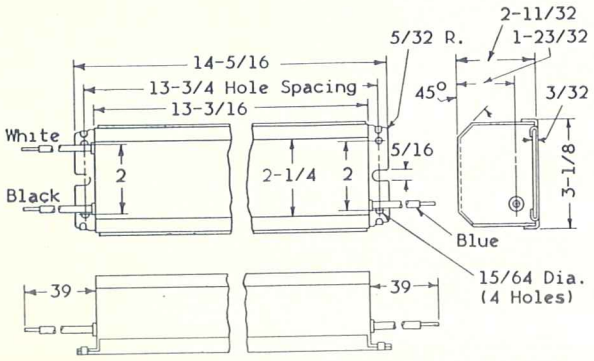


FIG. 10

Style No.	Dimensions and Wiring	Approx. Line Current	Approx. Watts Loss
60-Cycle Ballasts			
1 121 813	Fig. 10 & L	1.12	30
1 121 814	Fig. 10 & L	0.63	30
1 121 815	Fig. 10 & L	0.56	30
1 121 819	Fig. 9 & M	2.05	35
1 121 820	Fig. 9 & M	1.16	35
1 121 821	Fig. 9 & M	1.13	35
50-Cycle Ballasts			
1 121 825	Fig. 10 & L	1.13	32
1 121 826	Fig. 10 & L	0.64	32
1 121 827	Fig. 10 & L	0.57	32
1 121 828	Fig. 9 & M	2.08	37
1 121 829	Fig. 9 & M	1.18	37
1 121 830	Fig. 9 & M	1.04	37

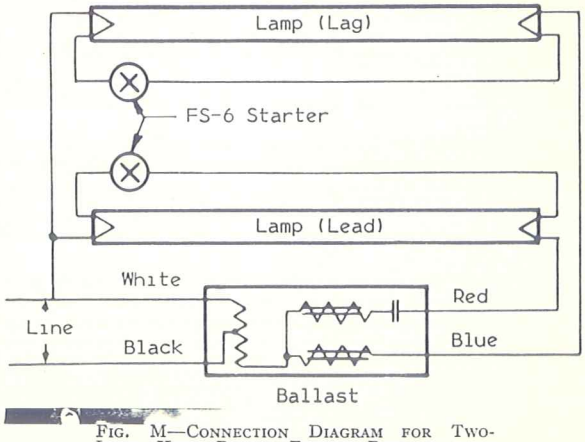


FIG. M—CONNECTION DIAGRAM FOR TWO-LAMP HIGH POWER FACTOR BALLAST WITH SEPARATE GLOW STARTERS.

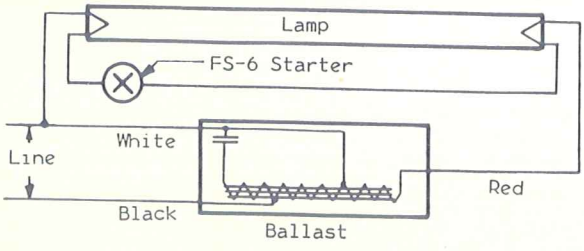
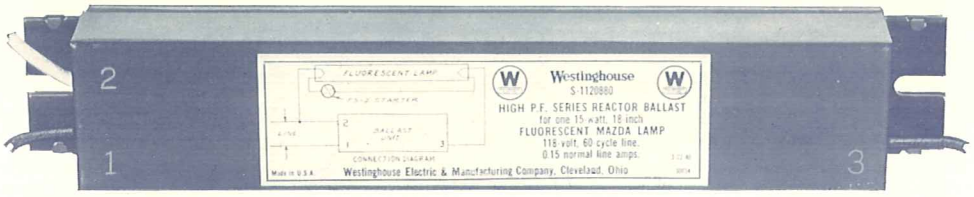


FIG. L—CONNECTION DIAGRAM FOR SINGLE-LAMP HIGH POWER FACTOR BALLAST WITH SEPARATE GLOW STARTER.

FLUORESCENT SINGLE-LAMP BALLAST UNITS



TYPICAL SINGLE-LAMP BALLAST UNIT FOR FLUORESCENT LAMP

Application

Westinghouse Single-Lamp Fluorescent Ballast Units are designed to regulate the operation of one tubular Fluorescent lamp.

One ballast of proper characteristics for the lamp selected must be used with each lamp. The ballasts are designed for alternating current operation only.

All ballasts are intended for use in conjunction with FS socket-type starting switches.

Construction

These Single-Lamp Ballasts are made in two types: the low power-factor type having approximately a 60% lagging power-factor, and the high power-factor type having a capacitor within the case connected across the line, resulting in a power-factor of 90% or better.

Both of these types are made for all lamp sizes and in standard voltage ranges. They are sturdy and compact and are built complete in attractive, compound-filled cases.

The essential elements of the high power-factor ballast unit are a reactor or transformer and a capacitor for power-factor correction. The essential element of the low power-factor type is the reactor or transformer only.

Noise during operation is reduced to a minimum by the rigid and compact assembly of the core and coil, plus a thorough impregnation of these before finally being placed in the case and covered completely with compound.

Lead Wires—The lead wires are #18 gauge, stranded copper wire with high temperature rubber insulation and of sufficient length to make direct connections to the lamp sockets.

Power-Factor—To correct the power-factor of the low power-factor type ballast, an external capacitor should be used. Refer to page 34 for complete information concerning these capacitors.

Approval—All 60-cycle ballast units are approved by the National Board of Fire Underwriters.

Installation

Single-Lamp Ballasts are small and are designed for mounting in standard wire-ways. However, all units have mounting lugs which also permit convenient installation in any other location.

All ballasts are made for indoor use and when used out-of-doors they must be protected from the weather.

SINGLE-LAMP BALLASTS

Lamp Size Inches	Lamp Watts	Approx. Line Voltage	Power Factor %	Style No. 60 Cycles	List Price 60 Cycles	Style No. 50 Cycles	List Price 50 Cycles	Std. Pkg. Qty.	Wt. Lbs. Per Std. Pkg.	
									60 Cycles	50 Cycles
Low Power Factor										
18	15	110–125	55	1 119 958	$0 65	1 119 979	$1 40	20	23	25
24	20	110–125	55	1 119 959	0 65	1 119 980	1 40	20	23	25
36	30	110–125	55	1 119 960	2 40	1 120 688	3 30	20	54	56
36	30	199–216	60	1 119 961	1 50	.....	.....	20	52	..
36	30	220–250	60	1 119 962	1 50	1 120 754	2 40	20	52	54
48	40	110–125	60	1 119 963	2 40	1 120 689	3 30	20	58	60
48	40	199–216	60	1 119 964	1 50	.....	.....	20	52	..
48	40	220–250	60	1 119 965	1 50	1 120 755	2 40	20	52	54
High Power Factor										
18	15	110–125	90–95	1 120 880	2 75	1 121 197	4 75	20	35	37
24	20	110–125	90–95	1 120 881	2 75	1 121 198	4 75	20	35	37
36	30	110–125	90–95	1 120 882	4 25	1 121 199	5 75	10	64	66
36	30	199–216	90–95	1 120 883	3 40	1 121 200	5 25	10	54	56
36	30	220–250	90–95	1 120 884	3 40	1 121 201	5 25	10	54	56
48	40	110–125	90–95	1 119 716	4 25	1 121 202	5 75	10	64	66
48	40	199–216	90–95	1 120 885	3 40	1 121 203	5 25	10	54	56
48	40	220–250	90–95	1 120 886	3 40	1 121 204	5 25	10	54	56

Sockets and Starters are available from the Bryant Electric Company, Bridgeport, Connecticut.

Lamps—Fluorescent Mazda lamps are available from Westinghouse Electric & Manufacturing Company, Bloomfield, N. J.

Order by Style Number

ENGINEERING DATA

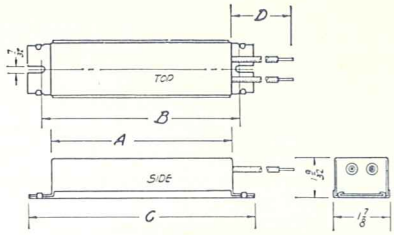


FIG. 3

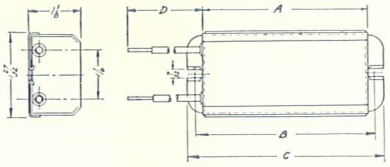


FIG. 4

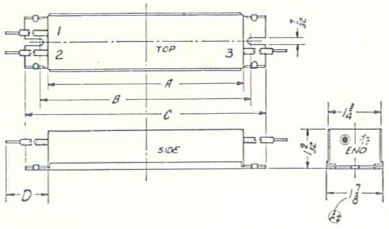


FIG. 5

SINGLE-LAMP BALLAST UNITS

Style No.	Dimensions and Wiring	Approx. Line Current	Approx. Watts Loss	Dimensions in Inches A	B	C	D
Low Power-Factor, 60 Cycles							
1 119 958	Fig. 4 & D	.30	4½	3 9/16	3 7/8	4¼	8½
1 119 959	Fig. 4 & D	.35	4½	3 9/16	3 7/8	4¼	11½
1 119 960	Fig. 5 & G	.66	10	9½	10	11	15½
1 119 961	Fig. 3 & D	.33	9	5 5/8	6⅛	7⅛	16½
1 119 962	Fig. 3 & D	.33	9	5 5/8	6⅛	7⅛	16½
1 119 963	Fig. 5 & G	.80	13	9½	10	11	21½
1 119 964	Fig. 3 & D	.42	12	5 5/8	6⅛	7⅛	21½
1 119 965	Fig. 3 & D	.42	12	5 5/8	6⅛	7⅛	21½
Low Power-Factor, 50 Cycles							
1 119 979	Fig. 4 & D	.30	6½	3 9/16	3 7/8	4½	8½
1 119 980	Fig. 4 & D	.35	7½	3 9/16	3 7/8	4½	11½
1 120 688	Fig. 5 & G	.66	15	9½	10	11	15½
1 120 754	Fig. 3 & D	.33	13½	5 5/8	6⅛	7⅛	16½
1 120 689	Fig. 5 & G	.76	19	9½	10	11	21½
1 120 755	Fig. 3 & D	.42	15½	6	7	8	22½
High Power-Factor, 60 Cycles							
1 120 880	Fig. 5 & E	.18	4½	9½	10	11	6½
1 120 881	Fig. 5 & E	.23	4½	9½	10	11	9½
1 120 882	Fig. 5 & F	.37	10	11	11½	12½	14¾
1 120 883	Fig. 5 & E	.20	8	9½	10	11	15½
1 120 884	Fig. 5 & E	.18	9	9½	10	11	15½
1 119 716	Fig. 6 & F	.50	13	11	11½	12½	20¾
1 120 885	Fig. 5 & E	.28	12	9½	10	11	21½
1 120 886	Fig. 5 & E	.25	13	9½	10	11	21½
High Power-Factor, 50 Cycles							
1 121 197	Fig. 5 & E	.18	4½	9½	10	11	6½
1 121 198	Fig. 5 & E	.23	4½	9½	10	11	6½
1 121 199	Fig. 5 & F	.37	15	11	11½	12½	14¾
1 121 200	Fig. 5 & E	.20	13½	9½	10	11	15½
1 121 201	Fig. 5 & E	.18	13½	9½	10	11	15½
1 121 202	Fig. 5 & F	.50	19	13 3/16	13 11/16	14 11/16	20½
1 121 203	Fig. 5 & E	.28	15½	13 3/16	13 11/16	14 11/16	20½
1 121 204	Fig. 5 & E	.25	15½	13 3/16	13 11/16	14 11/16	20½

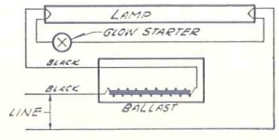


FIG. D—CONNECTION DIAGRAM FOR SERIES BALLAST REACTOR AND SEPARATE GLOW STARTER

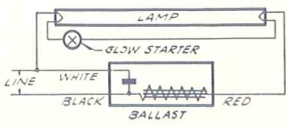


FIG. E—CONNECTION DIAGRAM FOR SINGLE-LAMP HIGH POWER-FACTOR SERIES REACTOR BALLAST WITH SEPARATE GLOW STARTER

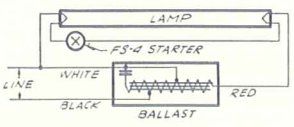


FIG. F—CONNECTION DIAGRAM FOR SINGLE-LAMP HIGH POWER-FACTOR AUTOTRANSFORMER BALLAST WITH SEPARATE GLOW STARTER

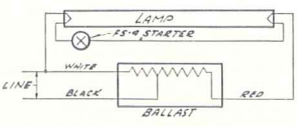
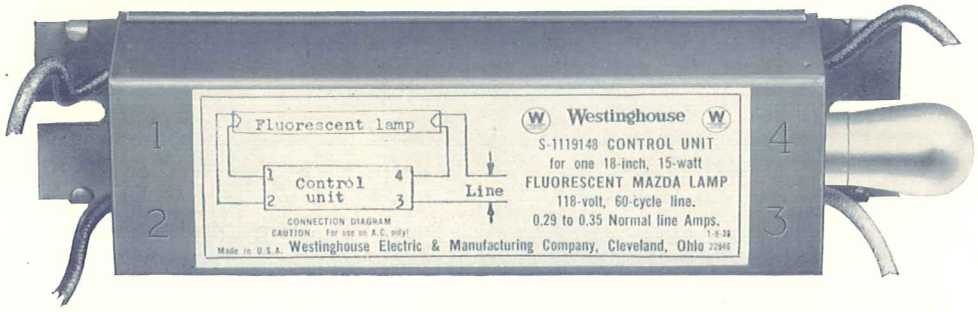


FIG. G—CONNECTION DIAGRAM FOR SINGLE-LAMP AUTOTRANSFORMER BALLAST UNIT AND SEPARATE GLOW STARTER

FLUORESCENT LAMP CONTROL UNITS



FLUORESCENT LAMP CONTROL UNIT-GLOW RELAY TYPE

Application

Westinghouse Fluorescent Lamp Control units are designed to regulate the operation of tubular Fluorescent lamps.

One control, of proper characteristics for the lamp selected, must be used with each lamp. The controls are designed for alternating current operation only.

Construction

Westinghouse Fluorescent Mazda lamp control units are made in the glow relay type for operating 15 and 20-watt lamps.

They are sturdy and compact and are built complete in *compound filled case.*

The essential elements of the control unit are the starting switch, the reactor or transformer and a small capacitor for eliminating radio interference.

Glow Relay—The glow relay used as a starting device is conveniently mounted in a bayonet socket in the end of the case permitting easy replacement if a burnout occurs because of improper installation or abnormal line conditions.

The glow relay consumes no current while the lamp is in operation and starts the lamp in approximately two seconds. Re-starting is also approximately two seconds.

Lead Wires—The lead wires are stranded copper covered with high temperature rubber and are of sufficient length to make direct connections to the lamp sockets.

Each lead is plainly marked to facilitate proper wiring; a connection diagram appears on the label of each unit.

Power Factor—The power-factor of the various controls is shown in the table below. Suitable capacitors for power-factor corrections are available See page 8.

Frequency—Controls listed are for 60-cycle service only. Units for 50-cycle operation can be supplied, prices will be quoted upon request.

Installation

Control units are designed for mounting in standard wireways. The mounting lugs permit convenient installation in any other location. The small size of the units allows mounting in location where conservation of space is a factor. The controls are designed for indoor use and when used outdoors they must be protected from the weather.

Replacement Parts

Glow Relay Only Style No.	(for 18-inch and 24-inch Units) Price
1 119 409	$0 60

Lamp Size, Inches	Lamp Watts	Line Voltage 60 Cycle*	Approx. Power Factor	Standard Package		Style No.	Price
				Quantity	Wt., Lb.		
18	15	125	55	20	32	1 119 148†	$1 40
24	20	125	55	20	32	1 119 149	1 40

Sockets—Special sockets for Fluorescent lamps are available from the Bryant Electric Company, Bridgeport, Conn., and other manufacturers of electrical devices.

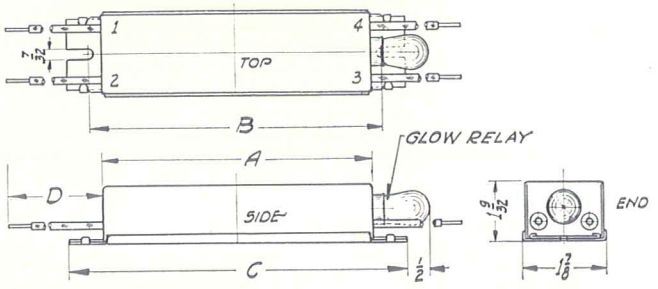
Lamps—Fluorescent lamps are available from Westinghouse Electric & Manufacturing Co., Lamp Division, Bloomfield, N. J.

* Control units for 50-cycle operation will be furnished on special order. Prices on request.

† Operates both 1-inch and 1½-inch diameter lamps.

OUTLINE DIMENSIONS IN INCHES

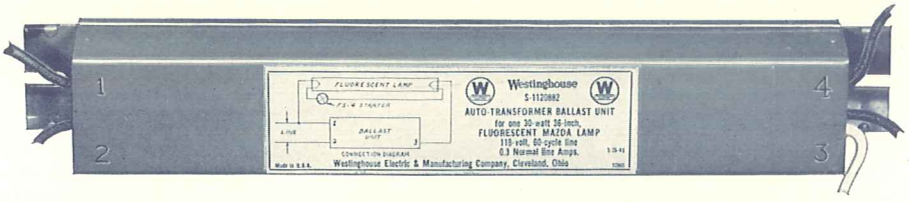
GLOW RELAY TYPE



Style No.	Lamp Size, Inches	Lamp Watts	Line Voltage 60 Cycle	Dimensions in Inches			
				A	B	C	D
1 119 148	18	15	110–125	5 15/16	6 7/16	7 7/16	8
1 119 149	24	20	110–125	5 15/16	6 7/16	7 7/16	11

FLUORESCENT LAMP CONTROL UNITS

For Direct Current Operation



FLUORESCENT LAMP CONTROL UNIT FOR D-C. OPERATION

Westinghouse Fluorescent Controls for use on Direct Current are available for 15 and 20 watt lamps only and require auxiliary resistance as indicated.

The basic elements of direct current controls are the starting switch, the reactor or transformer and a small capacitor to minimize radio interference.

The Starting Switch is a thermal type of rugged construction enclosed in the case proper. Essentially it is a bi-metal switch activated by a small heating filament.

Lamp Size Inches	Lamp Watts	Line Voltage	STD. PACKAGE Quan.	STD. PACKAGE Wt. Lbs.	Style No.	List Price	Dimensions and Wiring	Approx. Line Current	Watts Loss	External Ohms Resistance Required	DIMENSIONS IN INCHES A	B	C	D
18 x 1	15	100–120	20	32	1 119 200	$1 75	Fig. 7 & H	0.30	3	198	5⅝	6⅛	7⅛	23½
18 x 1½	15	100–120	20	32	1 119 200	1 75	Fig. 7 & H	0.31	3	190				
24 x 1½	20	100–120	20	32	1 119 200	1 75	Fig. 7 & H	0.31	3	144				

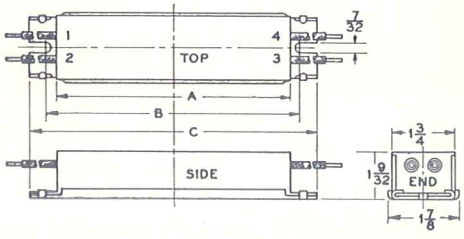


FIG. 7

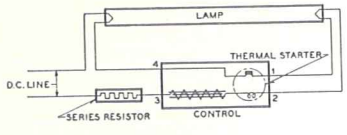
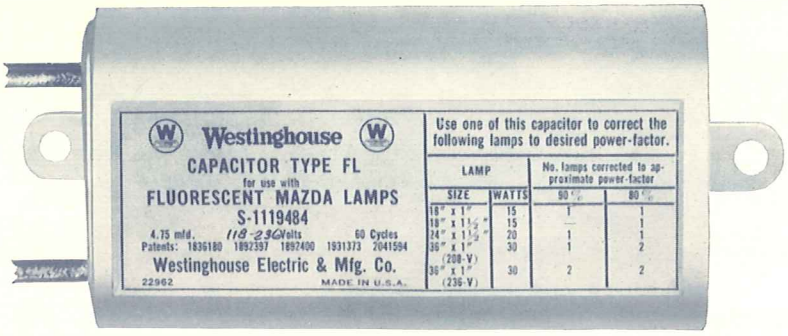


FIG. H—CONNECTION DIAGRAM FOR D-C. CONTROL UNIT WITH THERMAL STARTER AND SEPARATE RESISTOR

Order by Style Number

FLUORESCENT LAMP CAPACITORS

For Power-Factor Correction



TYPICAL CAPACITOR FOR POWER-FACTOR CORRECTION OF FLUORESCENT LAMPS

Application

These Westinghouse Capacitors are designed for the improvement of the power-factor of Fluorescent Mazda lamp installations.

The power-factor of an uncorrected Fluorescent lamp installation is between 50 and 60%. Improvement in the power-factor by the use of these capacitors means additional lamps may be installed on the same branch circuit.

Construction

The capacitors consist of alternate layers of metal foil and insulation which are hermetically sealed in attractive metal cases. The entire assembly inside the case is impregnated and covered with a non-inflammable, non-explosive liquid having excellent insulation and dielectric characteristics.

Installation

The capacitors are small in size and their cross-section permits installation in standard wireways. They are provided with suitable mounting lugs and leads, simplifying installation and connection. The units are approved by the National Board of Fire Underwriters and are so listed.

The capacitor should be applied as close to the load center as possible. This demands that the lamps be corrected in small groups to obtain best results. Westinghouse capacitors have been designed to meet these requirements.

Line Voltage 60 Cycles*	Rating Microfarads	Style No.	List Price	Standard Package		Dimensions in Inches			
				Quantity	Wt. Lb.	A	B	C	D
110–125 | 220–250	4.75	1 119 484	$1 75	10	12	4 5/16	5	5 1/2	15
110–125 | 220–250	17.50	1 119 482	3 80	10	33	13 1/2	14 3/16	14 11/16	15
110–125	28.00	1 119 483	4 30	10	33	13 1/2	14 3/16	14 11/16	15
110–125	6.50	1 120 812	1 85	10	12	4 5/16	5	5 1/2	15
110–125	11.00	1 120 813	2 50	10	14	5 5/8	6 3/16	6 13/16	15

* May be used on 50 cycles.

APPLICATION DATA
CAPACITORS FOR POWER FACTOR CORRECTION OF FLUORESCENT LAMPS

Lamp Watts	Line Voltage	Control or Ballast Used	Number of Lamps That Can Be Corrected to 90% Power-Factor and Capacitor Required	
			No. of Lamps	Capacitor Style No.
15	118	1 119 148	1	1 120 812
		1 119 958	3	1 119 482
20	118	1 119 149	1	1 119 484
		1 119 959	3	1 119 482
30	118	1 119 960	1	1 120 813
40	118	1 119 963	1	1 120 813
30	208	1 119 961	1	1 119 484
30	236	1 119 962	1	1 119 484
40	208	1 119 964	1	1 119 484
			4	1 119 482
40	236	1 119 965	1	1 119 484
			5	1 119 482

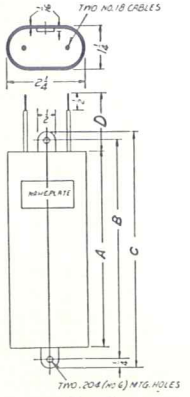


FIG. 6

Order by Style Number

WESTINGHOUSE . . . a pioneer in all forms of visual lighting . . . makes it easy to reap the benefits of this new kind of illumination. All fluorescent lamps, controls, sockets and reflecting equipment, in a wide variety of sizes and shapes, for both Commercial and Industrial applications, are available from a single supplier . . . all bearing the Westinghouse trade-mark . . . a guarantee of the finest in fluorescent lighting.

Stocks and services are available nationally through the Westinghouse Electric Supply Company and Independent Westinghouse Lighting Distributors for any installation, large or small. Demonstration installations and engineering counsel on the proper application of fluorescent lighting are standard services offered without charge.